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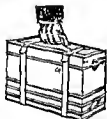
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Dr. George Selkirk Jones, Ph.D., L.S.A., in an original article, first printed in *Medical Reports*, London, says: "I am desirous of placing upon record the two following clinical cases, which have come within the sphere of my professional occupation. The first was that of a lady, the subject of a periodically recurring hemicrania of a decidedly neurotic type, upon whom the usual remedies had (*ad nauseam*) been tried, with occasional benefit alternated with disappointment. This led me to persevere with Antikamnia tablets, one every two hours for eight doses. This case having secured for me a meed of confidence, I have labelled it, mentally, as my first success with this preparation.

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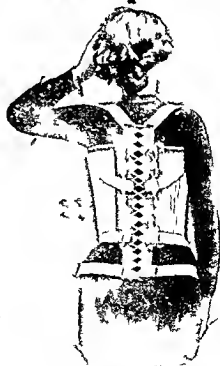
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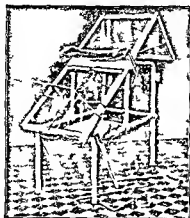
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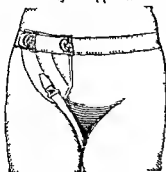
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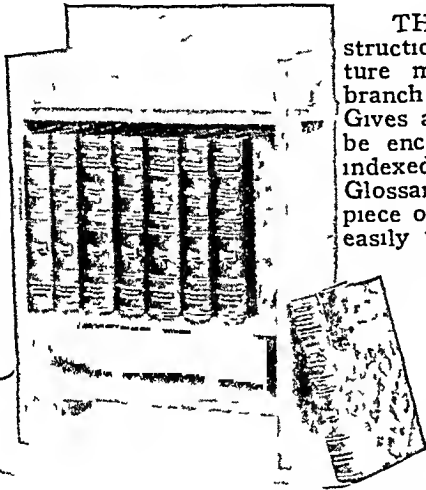
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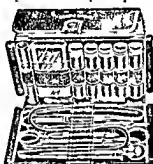
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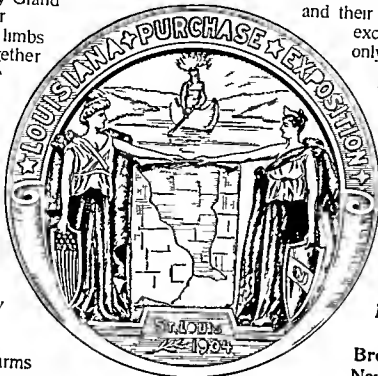
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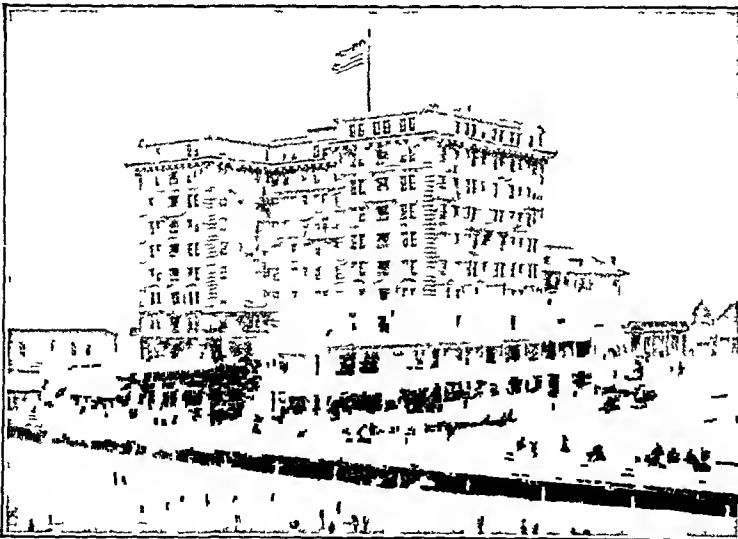
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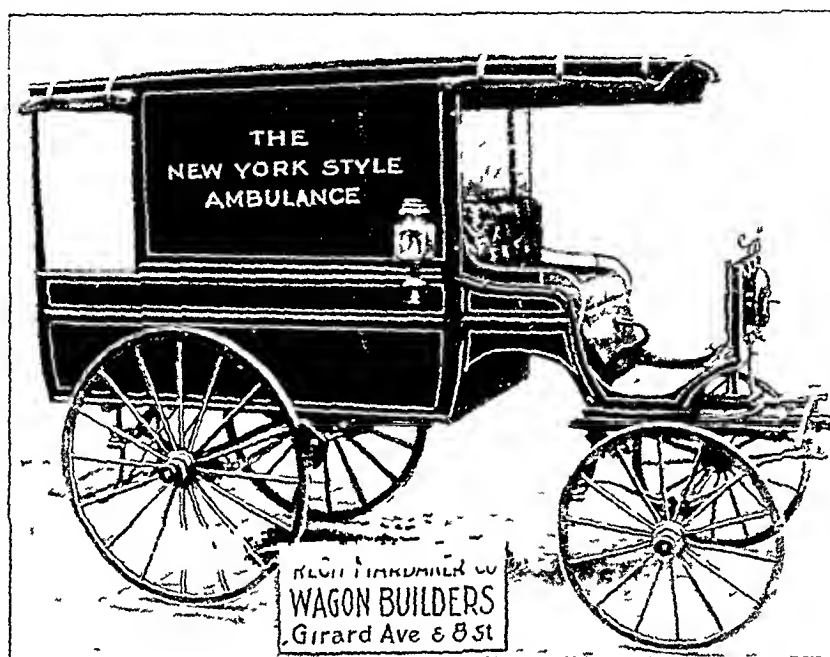


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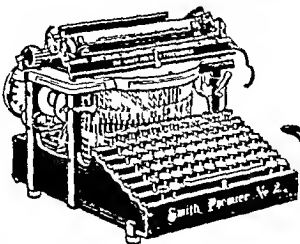
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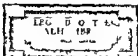
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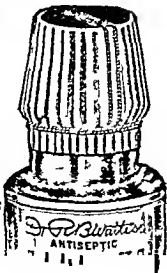
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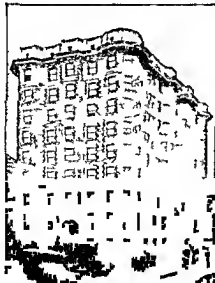
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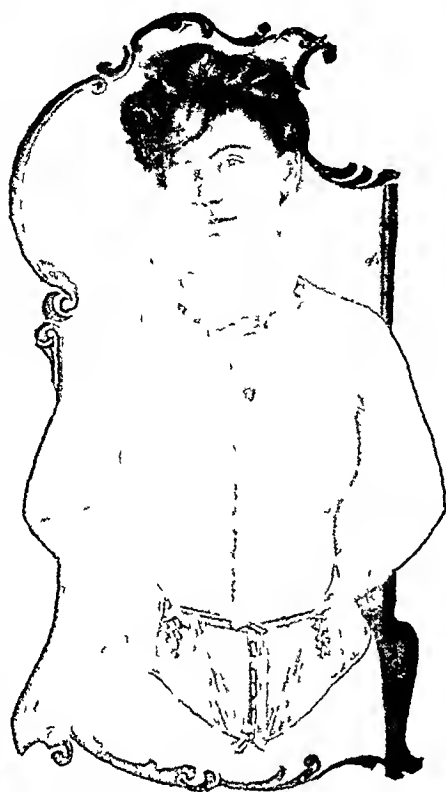
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ORIGINAL MEMOIRS

INTESTINAL OBSTRUCTION DUE TO VOLVULUS OR ADHESIONS OF THE SIGMOID COLON WITH A REPORT OF FIVE CASES AND A STUDY OF THE ETIOLOGICAL FACTORS

ONE CASE OF RECURRENT VOLVULUS OF SIXTEEN YEARS DURATION THIRTY
TWO ATTACKS CURED BY RESECTION SECOND AN OBSERVATION
AT OPERATION OF ACUTE VOLVULUS SEVEN HOURS
AFTER THE ONSET OF SYMPTOMS

BY JOSEPH C BLOODGOOD M D

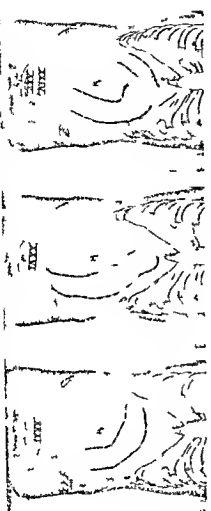
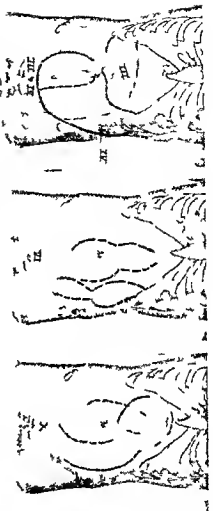
OF BALTIMORE, MD

A t P I I S g r y l t h J h H p k U i r s l t y

THE object of this paper is not only to report two cases of volvulus which agree with the usual clinical picture and pathology of this rather rare form of intestinal obstruction but to call attention to a distinct clinical picture of a more chronic nature which is associated with adhesions in the left side of the abdomen to the sigmoid colon or its mesentery. These adhesions may lead to acute volvulus or to recurrent attacks of abdominal pain or to definite attacks of partial obstruction. From this experience I am of the opinion that there may be a larger number of such cases which are treated for chronic constipation or under the diagnosis of an abdominal neurosis. The patients whom I have observed and whose histories are here reported have been relieved by operative intervention.

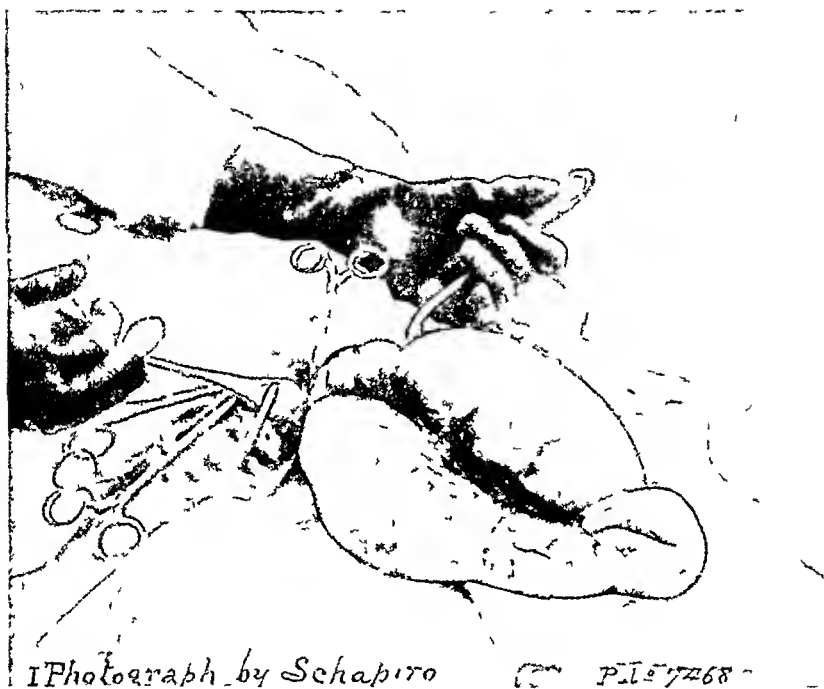
The first case (Case I, see Chart 1 and Figs 1 to 8) has previously been reported before the Southern Surgical and Gynæcological Association ("Transactions," vol xix, 1906, p 503) This case is of great interest, because it is an example of recurrent attacks of intestinal obstruction due to volvulus of the sigmoid We can be certain of the correct diagnosis, because at the first attack the abdomen was opened and the huge twisted sigmoid reduced In the next sixteen years there were thirty-two attacks After the last attack the abdomen was opened and the giant sigmoid resected There were no adhesions, but the mesentery of the sigmoid colon was thickened and the foot points were approximated closer than normal (Figs 1 and 2) This case is of additional interest as it allowed thirty-two observations on the clinical history and picture of this form of intestinal obstruction Such an observation is of educational value, as rarely in any large surgical clinic in an equal period of sixteen years has such a number been observed During this period in Professor Halsted's clinic of the Johns Hopkins Hospital, among 103 cases of intestinal obstruction, there has been but one other case of volvulus of the sigmoid colon This case (Case 1) is of further interest, as it demonstrates that acute volvulus of the sigmoid colon can be relieved by properly administered rectal enemata in the knee-chest position It also brings out the fact that relief of a distinct volvulus of the sigmoid by this method or even by laparotomy and untwisting is but a palliative procedure, and that one should look for the cause of the volvulus, a band of adhesions, and, in some cases, should consider primary resection

The second case gave me the opportunity to observe the first attack of an acute volvulus, to explore it seven hours after the onset of the first symptom and to find at the operation the band of adhesions which may have been the only etiological factor (Fig 9) Primary resection was not done, the adhesions only were divided One cannot look upon this patient as permanently relieved, because it is less than two years since the operation In the first case reported here



C I—D gr f p t h bo l m } t th th d f urth a ti t th
 tw ty f urth tw ty sa th d th ry g t t k O y th f urth h t h w per d
 tale m m t t nly t sgn d l th te k th m t co g d t th t er

FIG. 1



Photograph by Schapiro

PL 57468

CASE I—Photograph at operation of the giant sigmoid colon. No adhesions; the apex of the U-shaped bowel reached almost to the ensiform cartilage. This photograph illustrates the approximation of the foot points.

there was an interval of two years between the first and second attack

In the third case the abdomen was opened five days after the onset of the acute symptoms and forty-eight hours after they had subsided. Nothing definite was found and nothing was done. The history however suggested a volvulus of the sigmoid colon and this patient has been free from further attacks two years and four months.

In the fourth and fifth cases a diagnosis of chronic obstruction of the sigmoid colon due to adhesions was made and these adhesions were found and relieved at operation.

Further observation may demonstrate that the number of such chronic cases which do not go on to a volvulus with its acute symptoms are more numerous and that patients with chronic constipation and recurrent attacks of abdominal pain simulating left sided renal colic may be relieved of their more or less chronic invalidism by operative intervention just as to day we are relieving many patients whose abdominal symptoms are due to chronic appendicitis with which there are no definite acute attacks.

CASE I—Pathol No 7468 (Chart 1 Figs 1 to 8) W M *recurrent volvulus of the sigmoid thirty two attacks in sixteen years resection of giant sigmoid after the last attack recovery well two years and four months since operation*

Clinical History—This patient was first admitted to the surgical wards of the Johns Hopkins Hospital in January 1890. The operation was performed in August 1906 five days after the thirty second and last attack.

I am able from this case to study the clinical history and physical examination of thirty two attacks of definite intestinal obstruction experienced by one patient. The first attack began when the patient was forty even years of age. He was admitted to the ward on the seventh day of the attack and subjected by Dr Halsted to immediate operation at which the volvulus was untwisted. After this there was an interval without an attack of two years when the patient sought treatment on the fifth day of the second attack. The obstruction was relieved by enemata. Seven days later the abdomen was explored by Dr Finney who

found a large colon and a large sigmoid still twisted, although the patient had no symptoms. The intervals between attacks in the next four years were twenty, twelve, and sixteen months, the patient seeking relief on the second, third, and seventh day respectively. Relief in each instance was easily accomplished with the rectal tube. From this time on—from 1898 to 1906, a period of nine years—the attacks were more frequent. The longest interval of freedom was nine months, the shortest twenty-four hours. In the years 1900, 1902, 1904, and 1905 there were four or five attacks in each year. It was for this reason that the patient desired relief by more radical means. It is of interest to note that in all, except the first attack, the patient was relieved at once by the passage of the rectal tube. The finding at the second operation,—that the sigmoid was still twisted after an apparent relief from the rectal tube,—may explain the subsequent attacks which occurred twenty-four hours to a few days after the patient left the hospital apparently relieved, and one attack that occurred in the hospital while the patient was in bed a few days after successful treatment with the rectal tube.

When I opened the abdomen five days after the thirty-second attack the sigmoid was untwisted, and there was no obstruction, but I could demonstrate clearly what little force was required to twist or untwist the horse-shoe-shaped giant sigmoid on its thickened mesocolon.

The First Attack—The patient was then forty-seven years of age. Fifteen years before he had suffered from an attack of typhoid fever without complications. For a number of years he experienced attacks of indigestion at intervals of from four to six weeks. During these attacks his abdomen was distended with gas and he felt nauseated. Further details of these attacks are not given. Three months ago he fell and struck the abdomen, while he was doing some heavy lifting. The present attack is of one week's duration. He had been constipated, when suddenly he experienced general abdominal colic and a constant desire for stool. From the onset there had been no passage of fecal matter or gas. The patient observed a little mucus, but no blood. The abdomen gradually distended. In spite of these symptoms the patient continued to take food and to work. Vomiting began after three days, and has been present off and on ever since. This vomiting is associated chiefly with food or the cathartics which

he has taken. The initial acute pain of obstruction of the small intestine and the primary shock and vomiting were absent but we have the symptoms of obstruction in the large intestine—constipation abdominal colic secondary vomiting distention. On admission the patient's condition was good—the abdomen was uniformly and greatly distended. The operation was performed at once by Dr. Halsted. It is noted that the sigmoid colon was tremendously distended and protruded through the wound. The volvulus was complete after untwisting it is noted the mesocolon was long. Now a rectal tube was introduced which evacuated large quantities of gas and fluid feces. The wound was closed and the patient recovered without complications.

The Second Attack—According to the history there was no suggestion of an attack for two years. The symptoms were identical with those of the first attack except that vomiting began after forty eight hours—two days earlier and it is also noted that he had referred pain to the left lumbar region (similar to my more recent observations). He walked to the hospital. The examination showed uniform extension and tympany. With a rectal tube high enemata and massage gas and fecal matter were evacuated and the physical signs subsided. Dr. Finney opened the abdomen seven days later small intestines adherent to scar of previous median line incision and a loop of small intestine which was caught but not obstructed by a band was first encountered this band was divided transverse and ascending colon were larger than normal and there was a double twist in the sigmoid this was untwisted rectal tube passed which brought away gas and fluid fecal matter.

I wish to emphasize the finding at this the second operation. The patient was apparently relieved yet the sigmoid was still partly twisted.

Recurrent Attacks—I have carefully read the clinical notes on the subsequent thirty admissions and made charts of the symptom of onset the subsequent symptoms and the findings at examination (Chart 1). With very little variation each attack is a counterpart of all the others. Colic is the first warning. Now and then this has been preceded one or two days by constipation. On this special fact the history is often silent but records seem sufficiently clear to demonstrate that during all these years if the patient went forty eight hours without stool an attack

was sure to follow. In the majority of the attacks one day's constipation was followed the next day by colic and the beginning of an attack. In a few attacks the colic was observed within twelve hours after an apparent normal evacuation. Once the colic appeared the symptoms of obstruction continued until the patient sought relief in the surgical wards by the rectal tube. On a few occasions, a new attack followed relief from an old attack at the hospital with the rectal tube within twenty-four hours.

During the first seven years there were only five attacks, with intervals of from one to two years. In the next seven years there were twenty attacks with the longest interval of nine months. Among these twenty attacks nine were after very short intervals—twenty-four hours to ten days. In the following two years, although there were but six attacks, four of them were after brief intervals of freedom. The attacks, then, were becoming more frequent. As I look upon a short-interval attack as an evidence of incomplete reduction of the volvulus through the employment of the rectal tube and enemata, there is evidence, therefore, of an increasing number of incomplete reductions of the twist.

The duration of the attack from the time of the first symptom to relief varied from twelve hours to seven days. As a rule the patient was sufficiently uncomfortable to seek advice at the end of the third day. During the last three years he came to the surgical wards usually after twenty-four hours, and never waited longer than two days. The patient did this not because he was more uncomfortable, but apparently influenced by our advice and the confidence of getting immediate relief.

The patient never succeeded in relieving himself, although he frequently attempted this with rectal enemata.

The attack, preceded by an interval of constipation, began with general abdominal colic, now and then with pain referred to the lumbar region and back, then with distention of the abdomen, and if he delayed, vomiting. The latter was never a prominent symptom, except in those attacks in which the patient waited three to seven days. At the examination, except on the first two occasions, when the attack had been present five and seven days respectively, the distention was asymmetrical and confined chiefly to the left side of the abdomen, and peristalsis of the transverse and

descending colon could be made out (Chart 1). On not a single occasion was there any evidence of peristalsis of the small intestines. The percussion note was usually tympanitic. When the rectal tube was passed gas was evacuated first then fluid feces. The evidence seems to point to the fact that gas was the chief factor in producing the volvulus.

In a few attacks there was slight variation in the symptoms. For example in one of forty-eight hours duration and in another of three days duration vomiting and colic began together. In the other attacks there was a distinct interval between the onset of the colic and vomiting. With few exceptions vomiting was not present unless the attack was of forty-eight hours duration or longer. In a few vomiting was absent even when the colic, constipation and distention had been present from two to three days.

The first vomiting with few exceptions began after the patient had taken cathartics himself. When he took no food or cathartics vomiting was practically absent. It was never fecal.

Constipation was absolute in every attack and in only one it is noted that the patient passed some flatus. Distention with the rarest exceptions began within a few hours after the colic. In one or two attacks there were intervals of one to two days before the patient observed the distention. This is noted only in the early attacks before the patient had developed an acuteness of self observation. There are two leucocyte counts, one of 18,000 in an attack of three days and one of 9,000 in an attack of five days. There was never fever nor retention of urine. The patient's general condition was always good.

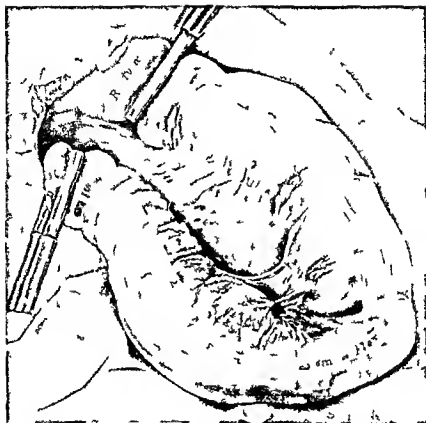
The Symptoms of Volvulus—From this study we may describe the clinical picture of volvulus as follows:

The patient will give a history of constipation—the attack begins with colic as a rule in the umbilical area and the left abdomen radiating from epigastrium to iliac fossa with pain sometimes referred to the left lumbar fossa and the back. Pain is never severe like the initial pain in obstruction of the small intestine or strangulation. The intervals between the pains grow shorter and with this their intensity increases. The character of the pain suggests its relation to peritubosis of the colon and this is confirmed at the examination because when one sees the wave of peristalsis the patient complains of pain.

The initial shock of small-intestinal obstruction or strangulation is absent. Initial vomiting is very rare. Following the colic the patient observes distention, chiefly on the left side, and most marked in the lower left quadrant, constipation continues, it is absolute, rarely is flatus passed, vomiting is a late symptom, and usually induced by cathartics or food, belching and hiccough now and then are observed, the latter is infrequent, leucocytosis may be found. At the examination, the distention is asymmetrical and broad peristaltic waves are present in the epigastrium and the left side of the abdomen. The percussion note is tympanitic. The patient's general condition is good, even in attacks of from three to seven days' duration.

The Mechanism of Volvulus—In this case there is evidence to indicate that dilatation of the sigmoid colon was present before the first attack. The cause of this cannot be ascertained. We have therefore to explain the mechanism of the recurrent attacks. There is every reason to believe that the sigmoid remained dilated (as shown in Fig 2 and found at the operation). This dilated colon acted as a reservoir for feces. I am impressed with the view that fermentation with the formation of gas in the dilated sigmoid colon is the first etiological factor, and careful observation would demonstrate that distention was the first symptom. This loop distended with gas is lifted up into the abdomen, just as the pregnant uterus is forced out of the pelvis by the growth of the foetus. As the sigmoid rises a kink is produced at its junction with the descending colon, because this portion of the colon is fixed. I demonstrated this at operation. This of itself would be sufficient to produce obstruction and excite peristaltic action of the colon, giving rise to the first symptom observed by the patient,—colic. At this time there is no evidence of a kink in the rectum, but the sigmoid does not evacuate its contents because its walls are overdistended. The exact mechanism of the twist is difficult to establish, but as the dilated sigmoid rises and its upper arm becomes more and more tense on account of its attachment to the fixed descending colon, the lower portion of the sigmoid and the upper rectum, which are less fixed, rise, and as the least resistance is up and to the left, the distended lower portion of the sigmoid and the rectum move in that direction, and the upper portion of the sigmoid is twisted downwards and to the right, while the lower portion moves upwards and to

F





CASE I—Photograph at operation with the clamps on the divided mesenteric vessels and sigmoid. This was performed before the gut was divided.



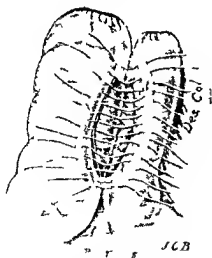
CASE I—Photograph at operation after the removal of the giant sigmoid colon. The closed ends of the rectum and colon are shown projecting from the wound without tension, in a convenient position for lateral anastomosis.



C I—Th k h d m h l f th r t d m p s f th r t m
 d d e s c d u g c o l t h m s e r y f t h m a l f t h g t m g n d l v e w f
 h l s e p p r o x i m t f b f o o t p o t f b g m d t h e r e w e r y l t l f l h g o f t h
 m t e r y d h m s e t r y l f t b e h d r y l t l d e n f n l m m r y h g e s

P 6

A

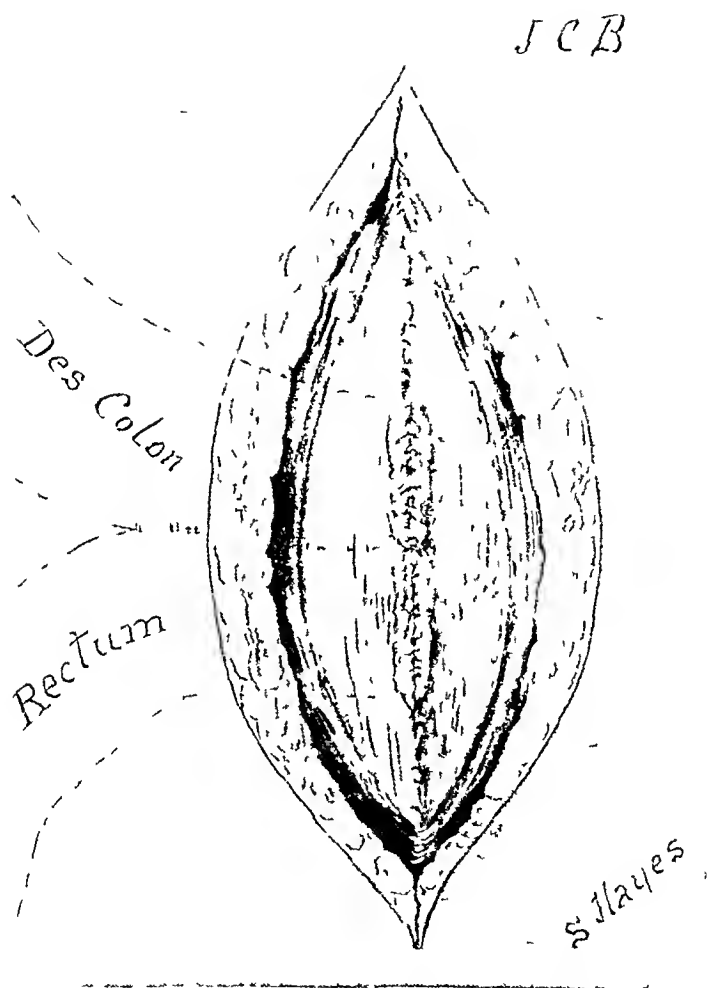


B



C I—Sk t h f h m h l f l e r l a n t o s b e t e e h m l l d s c f g
 c o l d l e e m

FIG 7



CASE I —Sketch of the method of including the closed inverted ends of the descending colon and rectum (Fig 6 B) in the suture of the parietal peritoneum of the wound

the left and the twist is from right to left. This mechanism is also aided by the attachment of the mesentery to the left. The twist kinks the rectum and we have a double obstruction.

From the notes of the first two operations it can be established with considerable probability that this was the position of the twisted giant sigmoid colon and at the third operation I was able to twist the sigmoid only in this direction.

The Mechanism of Relief—The rectal tube has to be forced past the kink in the rectum into the dilated sigmoid. If this is accomplished the gas immediately escapes followed by fluid faeces. On a number of occasions this could be accomplished only with the aid of water distending the rectum in front of the tube. It was found that when the patient was placed in the knee chest position the rectal tube could be inserted with less difficulty. On a few occasions there was no difficulty whatever in passing the rectal tube in any position of the patient while on others it required repeated efforts in the knee chest position. It seems easy to explain this by a variability in the extent of the twist. When there was little or no difficulty in inserting the rectal tube the probabilities are that the twist was slight or not present at all and in the most difficult cases the volvulus was complete.

Findings at the Third Operation—As the attacks were becoming more frequent the patient quickly consented to an operation which promised permanent relief without too large an element of risk.

On August 2, 1906, under ether narcosis I opened the abdominal cavity through the left rectus muscle. The sigmoid and ascending colon occupied the entire lower left quadrant of the abdomen. There were some adhesions of the small intestines to the abdominal wall in the region of the first laparotomy wound. As these were to the medial side of the present incision they were not disturbed. The patient was placed in the Trendelenburg position. Now without any difficulty the giant sigmoid colon was lifted out of the wound and placed upon the sterile towels covering the upper abdomen as shown in Figs 1 and 2. The distention of the colon began 10 cm from the splenic flexure at the beginning of the sigmoid colon involved the entire sigmoid and as much of the rectum as could be followed into the pelvis. The rectum below the promontory of the sacrum was covered with a thickened fold of peritoneum extending from the bladder.

All of the peritoneum over the pelvic floor felt thicker and had a more opaque whitish color than the normal peritoneum elsewhere. The mesocolon of the sigmoid was not unusually long and, in fact, rather short as compared with the size of the colon. The appearance of the peritoneum covering this mesocolon was entirely different from the normal peritoneum. It was a thick, opaque, white membrane, and one could not make out the vessels between the folds. The peritoneal covering of the rectum and lower half of the sigmoid colon presented the same thickened, opaque, white appearance. On the sigmoid colon the peritoneum of its upper third was normal in appearance, although the bowel was distended. The distention of the gut increased in diameter from the junction of the descending and sigmoid colon and reached its maximum in the upper portion of the rectum just below the promontory of the sacrum. Below this the distention was less, but the bowel was larger in diameter than the descending colon (Fig 2). The thickened condition of the peritoneum, both on mesentery and bowel, increased with the distention of the bowel. There were, however, no adhesions.

It was decided to resect, close the two ends by inversion and suture, and then perform lateral anastomosis. The point of resection was chosen in both instances through the bowel at the level of the abdominal wound as the giant sigmoid lay on the upper abdomen, having been placed there with gentle traction only (Figs 2 and 3). First the peritoneum of the mesosigmoid colon was divided (Fig 3) at the base between the foot points of the "U," turned back like a cuff, and each vessel separately ligated. Now, when the mesentery was divided there was no hemorrhage, and it could be protected with gauze, while the gut was divided. The division was made between the usual clamps with strong, straight scissors and disinfected with pure carbolic acid. The Paquelin cautery would have been simpler and more efficacious, but unfortunately it was not available at that time. The divided ends of the intestine were inverted with catgut in the usual way. The peritoneum was then again approximated with interrupted fine black silk. The ligated stumps of the mesenteric vessels were covered with a peritoneal suture. The two blind ends of the intestine lay side by side in the lower portion of the abdominal wound (Figs 4 and 5). A lateral anastomosis was made (Fig 6, *a* and *b*) beginning 15 cm from the inverted end, their mesen-



C. I—Ph t gr ph f pati t
 D mber 9 8 tw y d f
 m th ft pe tl

FIG 9



CASE II —Sketch illustrating the findings at operation
B band of adhesions between the upper third of the sig-
moid and the parietal peritoneum of the iliac fossa

teric surfaces came together to the medial side a large opening was made. In closing the wound the inverted ends of this anastomosis were placed outside of and included by the peritoneal suture (Fig 7). This anchoring was done for two purposes first because there is always danger of sloughing when intestines are inverted in this way especially when the bowel has been distended and its walls thickened while when sutured in this manner any leak would take place extraperitoneally second I was of the opinion that the anastomosis would work better if the bowel was fixed to the abdominal wall. The wound was closed with a small piece of packing extending to the ends of the intestine.

Following the operation there were no complications and the wound healed without any evidence of leakage from the closed ends of the intestine.

At this time December 1908 (two years and four months since the operation) the patient has had no further attacks of intestinal obstruction. He also informs me that his general health is better. There is no evidence of weakness in the scar and the stools are normal in every respect (Fig 8).

My second observation is of interest because it allowed me to see a volvulus in its acute stage and perhaps the etiological factor.

CASE II—Pathol No 7999 Mr F R S—Diagnosis acute intestinal obstruction two weeks after appendectomy. Operation seven hours after the onset of the symptoms. Laparotomy reduction of volvulus of sigmoid division of a band (Fig 9) between the sigmoid colon and the peritoneum of the left iliac fossa. Recovery.

Clinical History—White male aged 33. On February 19 1907 at the St Agnes Hospital I removed the appendix through a McBurney-Weir incision and closed the wound without drainage.

Pathologic Findings at This Operation—On opening the peritoneal cavity an unusually large cæcum and ascending colon were exposed the mesentery of the cæcum was longer than normal and covering the peritoneal surface of both extending to the mesentery and in places to the parietal peritoneum at the base of the mesentery there were numerous vascular bands of adhesions

The appendix, 8 cm long and free, was situated to the lower and median side of the cæcum. The appendix was covered with a fine net-work of new blood-vessels which extended to the cæcum. There was one band of adhesions producing an S-like constriction in the middle third of the appendix. These findings I have observed before in cases of enteroptosis of the colon. The adhesion producing a constriction of the appendix without doubt interfered with the emptying of this organ. The removed appendix showed an unusually large lumen and a wall thicker than normal. The right kidney was of normal size and in place.

Clinical History—The patient was referred to me with symptoms of renal colic. The first attack had taken place one year before. The attacks consisted of pain in the lumbar region and the right groin. These attacks were observed only when the patient was standing. The pain was of a dull character and was not associated with nausea or vomiting. The attacks have never been severe enough to confine the patient to bed. After the attacks the urine was cloudy, but there was no blood. The X-ray examination was negative as to renal calculi in kidney and ureter. On examination the kidneys could not be palpated, but on two occasions I felt in the right iliac fossa a movable finger-like mass. The urine contained a trace of albumin, oxalate crystals, and a few red blood-cells.

Postoperative Notes—The acute attack began two weeks after the appendectomy and after the patient had been out of bed about three days. He had been constipated twenty-four hours, but went to bed feeling first rate. At about three o'clock in the morning the patient was awakened out of a sound sleep with pain referred to the left loin posteriorly. The description of the pain answered somewhat to that of a renal colic. The pain in the first few hours was so intense that there were slight symptoms of shock (the so-called peritoneal shock,—an early sign of strangulation). There was the initial vomiting of acute obstruction. When the resident, Dr Shaw, examined him one hour after the onset of the pain, the patient was rolling in bed from side to side, flexing the thighs on the abdomen. The face was pale, the pulse, recorded at 8 P. M., at that time about 80, was now 120, the temperature (by mouth) subnormal. Morphia, gr $\frac{1}{8}$ was given at once and repeated in three-quarters of an hour. This simply relieved the acuteness of the pain. Two enemata were ineffec-

tual When the stomach was washed out nothing was removed but a little bile stained fluid

I saw the patient six hours after the first symptom The pain now was of a dull character The symptoms of peritoneal shock had disappeared The pulse was 90 the temperature 99 The total leucocytosis was 36 000 on a second count 40 000 The urine contained red blood cells a trace of albumin and some casts This finding which had been present before the first operation had disappeared a few days later When the foot of the bed was lowered for my examination (the patient had been placed in this position on account of shock) he complained of nausea and vomited the pulse increased to 130 There was no recurrence of the vomiting and the pulse dropped to 90 The area of pain was in the left loin to the outer side of a vertical line through the anterior iliac spine This area in my experience was situated lower and more to the median side than the pain in renal colic On palpation the patient stated that there was no tenderness but the left rectus and the left abdominal muscles were rigid preventing deep palpation I could make out no mass On percussion there was very slight obliteration of the liver dullness although the abdomen was not distended and in the left lumbar region there was a distinct zone of flatness not present on the right side On further palpation as the muscles relaxed I was of the opinion that I could feel a tense smooth tumor in the iliac fossa (Von Wahl's sign) The symptoms—shock initial vomiting Von Wahl's sign the inability to get feces or gas with enemata—were in my opinion evidence against renal colic and in favor of obstruction In addition we had a previous X ray as further evidence against stone The attack of pain on this left side differed from those on the right in intensity It seemed to me quite possible that the adhesions observed on the right side might also be present on the left side in the mesentery of the sigmoid colon

For these reasons I considered the diagnosis of volvulus as most probable and advised immediate operation rather than delay for attempts with further enemata On opening the peritoneum through the left rectus muscle there was no fluid and normal non distended small intestines were exposed Pushing these intestines upwards and to the median side I could see a very greatly distended sigmoid colon It was not twisted The veins

in the mesentery of this colon were tremendously engorged—an appearance in distinct contrast to the vessels in the mesentery of the small intestine, descending and transverse colon. This engorgement of the veins impressed me as the result of a twist in the sigmoid which had relieved itself, or which I had relieved in the manipulation necessary to expose it. The splenic and descending colon were distended. As I pulled the sigmoid colon out of the abdominal wound I observed an acute flexion in the upper third. From the mesentery at the apex of this flexion a definite band of adhesions passed down along the mesosigmoid to the peritoneum of the left iliac fossa (see Fig 9). The foot points of the “U” of the sigmoid were close together. The entire sigmoid was distended, and this distention extended into the rectum as far as it could be inspected. Now a rectal tube was passed, and a large quantity of gas and fecal matter withdrawn. I was able to increase this quantity by compression of the colon and rectum, and then hard fecal masses which were not evacuated by the tube could be felt.

As a rectal tube had been passed a few hours before operation with a negative result, it seems justifiable to conclude that the obstruction was relieved during the operation, because the rectum below the sigmoid was distended with gas and liquid fecal matter.

A complete resection of the sigmoid colon with lateral anastomosis of its foot points would not have been a difficult operation, but I decided to confine my intervention to division of the band only. After this band was divided the raw surface was covered with peritoneal suture.

Twelve hours after operation there was a large liquid stool containing solid fecal masses.

The convalescence from this operation was uneventful. One month after operation the patient had a slight attack of pain in the right hypochondrium. Three months later a second attack with nausea and vomiting. This attack was associated with constipation. At the present writing, December, 1908, one year and eight months since the second operation, there have been no further attacks.

CASE III—Pathol No 7942 *Clinical Diagnosis Question between volvulus and carcinoma of the sigmoid. Patient observed five days after the onset of the acute attack of intestinal obstruction. Exploratory laparotomy, negative findings.*

Clinical History—E. R. L. white male aged 40 was admitted to the Johns Hopkins Hospital on August 22 1906 and the following history was obtained from Dr Carr his physician and the patient. In the previous history there is nothing suggestive except that four and two years ago there were distinct attacks of dysentery in which the stools contained blood and mucus. In the interval between these attacks there were no symptoms but the last year the patient has observed an increasing constipation with intermittent ribbon stools but no loss of weight and no evidence of weakness or anæmia.

The acute attack began five days before his admission to the hospital. The symptom of onset was pain beginning in the left lumbar area and extending from here into the left iliac fossa the groin and the left testicle. The pain began about ten in the evening some hours after the last meal. Previous to the onset of the pain there had been no unusual constipation that the patient could remember. The pain began acutely the patient feeling in perfect health before. The first attack of pain lasted four hours and there was vomiting. Between Thursday and Sunday evening—a period of three days—there were four such attacks of pain. Except in the first attack the pain was not referred to the testicle. With each attack there was vomiting. As far as I could make out there was no marked shock. During this time he was given castor oil and numerous enemata without effect. When seen Sunday evening by Dr Carr there was an indistinct tender mass in the left iliac fossa. After this examination there was a large stool following the administration of a high enema. Since this time there have been no further symptoms and the mass and tenderness have practically disappeared. He entered the hospital Tuesday morning about 36 hours after the end of the symptoms. The patient was not in discomfort there was no abdominal distention but on deep palpation in the iliac fossa one gets the impression of feeling a distended piece of bowel. The urine was negative the leucocyte count 7000. When I first saw the patient although he was feeling comfortable the bowels had moved and he did not feel nauseated there was a distinct fecal odor to the breath and one suggesting acetone and during my examination the patient expectorated a thin brownish fluid which had a distinct fecal odor. For this reason I am inclined to the opinion that there had been fecal vomiting. This odor disappeared within 24 hours.

At this date, in 1906, over two years ago I was quite familiar with the clinical picture of volvulus from a study of the case reported first in this paper, because this patient (Case III) entered the hospital about three weeks after I had operated upon the patient in Case I. From this clinical history, however, one could not exclude a malignant tumor of the large bowel.

In a study of a number of such cases I have been struck with the observation that in the previous history, acute attacks of intestinal obstruction, lasting from one to five days with recovery after enemata have been present in at least one-fourth of the cases. *It is so unusual for a patient with acute intestinal obstruction to recover without operation, that such a history can be looked upon as evidence of a malignant tumor, but this more recent study of the rarer lesion—volvulus of the sigmoid colon—demonstrates that the same may occur here.*

At the operation in this third case on August 28, 1906, six days after the patient had been in the hospital without symptoms, I could find nothing abnormal. I could positively exclude a new growth. Whether there had been a volvulus I am not prepared to say. I carefully examined the mesentery of the sigmoid colon and could not find the adhesions observed in Case II and in Cases IV and V to be considered next. Whether at that time I overlooked some anatomical changes which I might recognize to-day from a larger experience, I am not prepared to say, but the gross lesions found in the other cases were not present. I am inclined, however, to the opinion that this patient had suffered from a volvulus of the sigmoid colon, and perhaps during the two attacks of dysentery inflammatory changes in the mesocolon had led to certain changes which were the etiological factor of the volvulus. This was distinctly so in the fourth case about to be reported.

At the present writing, December, 1908, two years and three months since the operation, this patient writes me that he is in perfect health and has had no further attacks.

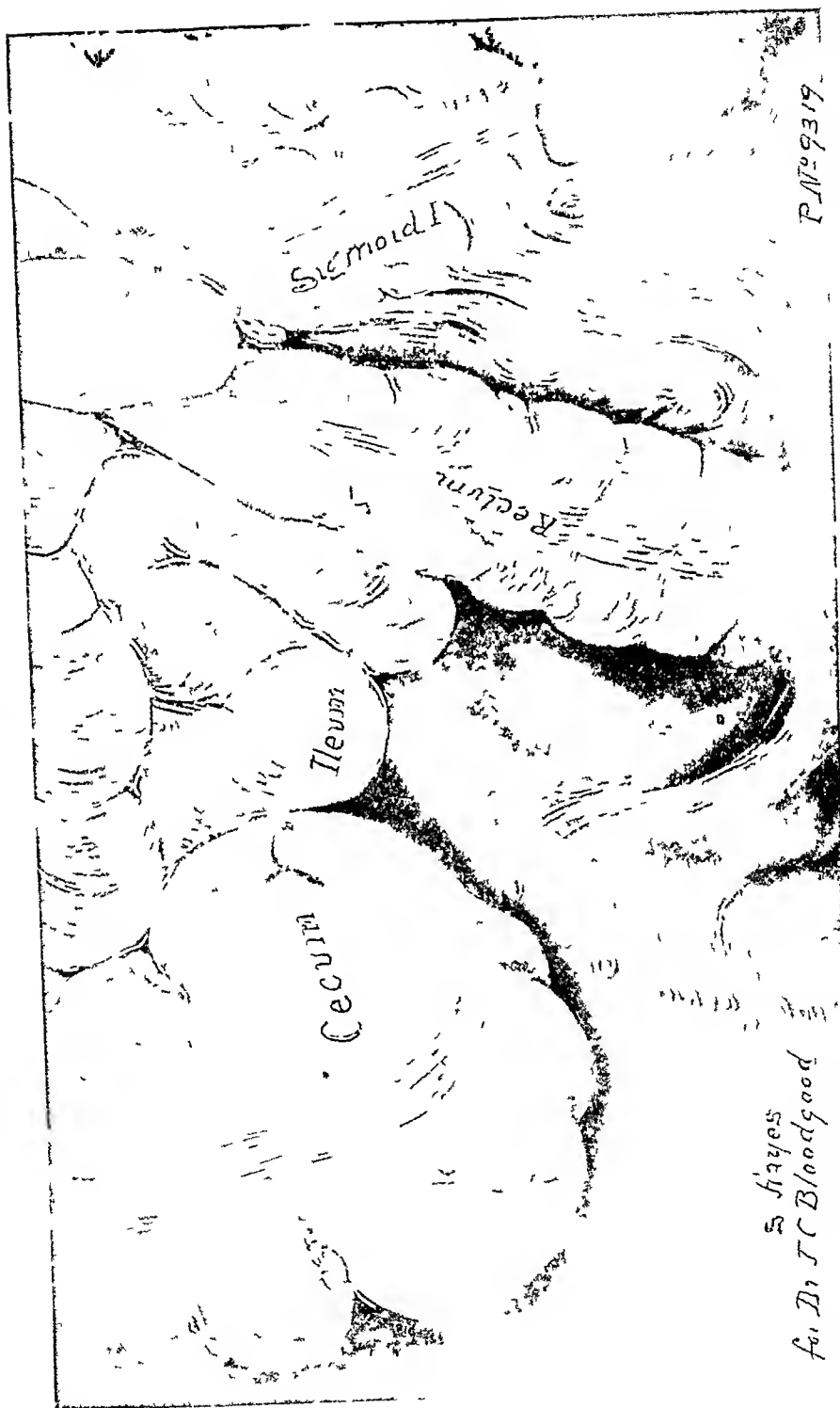
CASE IV—Pathol No 9149 *Clinical Diagnosis Chronic obstruction of the sigmoid colon. Operation Freeing of adhesions between the parietal peritoneum of the iliac muscle and the mesocolon (Fig 10). Recovery.*

This patient, a white male, aged 30, was brought to me by Dr Gregg, of Florence, S C, with a clinical history very suggestive of a stone in the left kidney. However, in going over the



C IV—Sk h f h f d gs pera h th d se dh be w h
 t f h mond id se d geol d th par al pe on m f h al f sa
 Th ppe d t d U h ped ga by h rt d m sen ry

FIG II



5 sizes
for Dr JCBloodgood

PN 9319

CASE V —Sketch of findings at operation showing the adhesions between the sigmoid colon and the peritoneum at the brim of the pelvis and the broad ligament

facts in the history I came to the conclusion that I was dealing with a chronic obstruction in the sigmoid colon. It was my experience with the cases just reported that led me to this belief. The X ray showed no stone in kidney or ureter.

We have in this case a history of dysentery ten years ago lasting some months. The first attack of abdominal pain began four years after the dysentery. In these six years there was an interval of five years between the first and second attack of pain and in the last four months there have been five attacks. The pain is referred to the same area described in Cases I and II. It is always preceded by constipation and associated with nausea and vomiting. The intense pain lasts from two to six hours. The relief is immediate when the enema is successful, sometimes more than one enema is required. In none of these attacks has the pain been referred to the testicle. Three months ago he had a slight attack of pain in the right iliac fossa.

The operation was performed at St. Agnes Hospital in August 1908. The sigmoid was explored through an incision at the outer border of the left rectus muscle with the patient in the Trendelenburg position. The findings were practically identical with those in Case II. The band of adhesions on the whole was broader and shorter (see Fig 10). Influenced by the involvement of the appendix in Case II, I explored the appendix in this case through a McBurney incision and removed it. The appendix was free and apparently normal but hitched up by a shortened mesentery (Fig 10).

It is four months since the operation and the patient has had no recurrence although in the three months preceding the operation there had been three attacks.

CASE V—Pathol No 9319 (*Recent case*) *Clinical Diagnosis* Chronic obstruction of the sigmoid colon of many years duration. *Operation* Freeing of adhesions (Fig 11) *Recovery*

Clinical History—White female aged 38 married no children. It was very difficult to get a clear clinical history. When I first saw the patient two years before the operation she had every symptom of a grave melancholia. However from the history at that time I was of the opinion that there was some mechanical obstruction in the sigmoid colon and operation was advised. I did not see the patient again until October 1908. During these two years in spite of absolute rest and the most careful dietetic treatment the symptoms had increased.

The patient had become a chronic invalid. She was in such a nervous state that she would not allow an examination of the abdomen. The slightest touch of the abdomen, the patient claimed, made her so nervous that she could not control herself, and it produced nausea.

Evidently some fifteen years ago, shortly after marriage, there had been a pelvic peritonitis, perhaps of gonorrhoeal origin. Gradually after this illness she observed increasing constipation, and during the last six years, in order to move the bowels, it has been necessary to take larger doses of cathartics. The patient has administered to herself a proprietary "liver pill," and the doses gradually increased from two to sixteen and twenty a day. Formed stools have not been observed for five years, and during the last two years it was necessary that they should be liquid before an evacuation could be had. The patient states that during all this time she experienced pain in the left lower abdominal quadrant. The pain is worse when twenty-four hours intervene without a stool. If she allows the constipation to go longer she observes distention in the left side of the abdomen, increase of the pain, and now and then vomiting. For three years she has been unable to continue her profession as a dentist and has sought relief in rest and diet. Except for this definite history of constipation and localized pain and the absence of normal formed stools, the patient exhibits the exaggerated picture of a neurosis.

I felt, however, from my experience in the other cases that there was a mechanical non-malignant obstruction. Its long duration excluded a malignant tumor, the old pelvic peritonitis suggested the etiological factor.

The operation was performed at the St Agnes Hospital November 7, 1908. The sigmoid was plastered by dense fibrous adhesions to the parietal peritoneum over the iliac muscle at the brim of the pelvis to the broad ligament, tube and ovary on the left side. The sigmoid could not be lifted from this bed. It was less movable than the lower half of the duodenum, and in this position there were two or three kinks (Fig 11). The adhesions could be divided with the knife in such a way that the visceral peritoneum of the sigmoid was not injured. After accomplishing this I could lift the sigmoid and demonstrate that its mesentery, although somewhat involved in the adhesions, was still intact. That is, the mesentery had not yet been converted into scar tissue.

Both tubes and the left ovary were removed. There were adhesions between the uterus and the rectum which could be divided with the knife and scissors. The division of all these adhesions caused practically no bleeding. The raw surfaces could be covered with peritoneal suture.

This patient after operation suffered for five days with distention of the abdomen. That is the postoperative paresis of the intestines was much more marked than usual. After this had subsided and the patient began to take ordinary diet normal formed stools were observed for the first time in years and I was able to gradually reduce the cathartic pills to two a day.

This patient is still in the hospital one month after operation because of a phlebitis of the right leg on the fifteenth day and a left sided pleurisy on the twenty third day. These complications we know are more frequent after pelvic operations.

Remarks—Volvulus of the sigmoid colon is one of the rarer forms of intestinal obstruction. Among 103 cases of intestinal obstruction observed in Dr. Halsted's clinic of the Johns Hopkins Hospital there have been but two examples observed. The first case is reported here the second observation is an example of a recovery although the operation of untwisting was not performed until the sixth day after the onset and it is interesting to note that in this case there was a recurrent attack within a year after the patient left the hospital which terminated fatally without operative intervention.

Literature—I have examined the literature since 1902 and it seems to be the opinion of the majority that the volvulus recurs if at the operation for relief the surgeon contents himself with only untwisting. No one however has advocated resection as a primary operation in all cases. If gangrene is present resection of course is indicated.

Kiwull a Russian surgeon in 1902 (*Mittheilungen a d Gren-gebieten d Med u Chir* 1902 vol x p 105) gives a very good discussion of the diagnosis. He recognizes two types—first the acute volvulus in which the clinical history and symptoms are practically identical with my Case II the

initial vomiting and shock of which, so common in the so-called group of strangulated ileus, are here present, second, the subacute type, in which these symptoms are absent and the vomiting does not come on until later. In all cases there is usually a previous history of constipation, in some the acute attack follows a large meal, in others a trauma. In all of the cases absolute constipation of feces and gas is observed, and if the examination is made early there is an asymmetrical distention on the left side of the abdomen. In a few cases the palpation of the distended loop (Von Wahl's sign) has been made out. This sign is more readily obtained if the abdominal muscles are relaxed by placing the patient in a warm bath. Peristalsis, if present, is observed chiefly in the transverse and descending colon rarely in the distended sigmoid loop (Chart I). Pain referred to the lumbar region,—a constant symptom in my cases,—is not mentioned prominently in the literature.

Kiwull reports eight cases observed in his clinic. This number is not only unusually large, but the results of operation were unusually good. There was but one death from pneumonia in a patient aged seventy-one. All of the patients were over forty years of age, and but one was a female. In the majority of his cases the operation was performed within forty-eight hours. It consisted in untwisting of the volvulus. In this report there are no observations of the condition of the mesentery. Gangrene was not observed, but in one case the circulation of the sigmoid looked impaired and for this reason the replaced intestine was isolated with iodoformized gauze. In the healing there was evidence of a fecal fistula which closed spontaneously. Kiwull expresses the opinion that the distended sigmoid is better evacuated of gas and feces by the introduction of a rectal tube at the operation, rather than by colostomy. This view stands good to-day. Kiwull states that the seven patients which recovered from the operation have been examined repeatedly since and there have been no recurrent attacks. Nevertheless when we read the detailed histories in not a single instance do we find a note of a later

examination For this reason I feel that Kiwull's statement as to results cannot be accepted

Kuhn contributes a monograph (*Beitr z klin Chir* 1902 vol xxxvi p 411) from Garre's clinic in which he reports 9 cases from his clinic and 95 from the literature Among these 104 cases in 20 resection was performed with about 50 per cent of recoveries

I have examined these cases of resection critically and I am of the opinion that resection in acute volvulus is only indicated when gangrene is present It is a simple procedure to untwist the volvulus and to evacuate the distended bowel by the passage of a rectal tube In gangrene the loop must be brought out of the abdominal cavity Now the question arises what further should be done? I am of the opinion that a lateral anastomosis should be made between the descending colon and the rectum the gangrenous sigmoid rapidly resected and the two open ends of the gut sutured in the parietal peritoneum for secondary closure Kuhn reports one successful resection for gangrene by Garre

Kuhn from his study is of the opinion that relief by the rectal tube and enemata will usually fail and that immediate operation is indicated and that in the majority of cases if resection is not indicated in the primary operation because of gangrene it should be done at a secondary operation

Philipowicz (*Arch f klin Chir* 1906 vol lxx pp 678 and 897) has had an unusual experience with volvulus of the sigmoid In the first place his material is very large Thirty-two among ninety-eight cases of intestinal obstruction observed in his clinic in Czernowitz involved the sigmoid flexure In the second place his mortality is unusually high Of twelve patients not subjected to operation eight died—a mortality of 66 per cent Of twenty patients operated upon thirteen died—65 per cent This unusually large number of cases not subjected to operation and the high mortality of the operative intervention seems to be explained by Philipowicz's faith in the rectal tube which he attempts first in every case and he advises that operation should not be done before the third day

Scudder of Boston (Reprint 1908, reference not given) reports on 121 cases of acute obstruction from the Massachusetts General Hospital. Among these there are nine cases of volvulus with nine deaths. Among these but two involved the sigmoid flexure. Resection was performed in one, colostomy in the other.

Conclusions—This study of volvulus of the sigmoid must be looked upon as incomplete. My own experience is limited, and the cases reported in the literature are not given with sufficient detail to draw definite conclusions as to the etiological factors.

At the present time, I am of the opinion, that the symptoms of acute or subacute volvulus of the sigmoid are sufficiently evident to allow treatment to be instituted in a stage in which the prognosis should be uniformly good. In the first place, the attempts at relief with the rectal tube and enemata should not be continued more than a few hours. During this time the patient should have no food and no cathartics. If this is unsuccessful the abdomen should be opened at once. When this is done resection is only indicated in the presence of gangrene. After untwisting the volvulus the bowel should be evacuated with the rectal tube. Now one should search in the region of the mesentery for bands or adhesions, these should be relieved and the raw surfaces covered with peritoneal suture. These patients should be carefully instructed, after their recovery, as to their diet and the use of cathartics to prevent constipation. In the event of recurrent attacks resection, as in my Case I, is indicated.

As to the other cases which I have reported in which the symptoms are chronic, laparotomy is indicated not only to relieve these symptoms, but as a prophylactic measure against the development of acute volvulus.

THE VALUE OF THE CAMMIDGE REACTION IN THE DIAGNOSIS OF PANCREATIC DISEASE *

FROM THE PRIVATE LABORATORY OF DR. JOHN H. MUSSER.

BY EDWARD H. GOODMAN M.D.

OF PHILADELPHIA

Assistant Medical University of Pennsylvania Dispensary Physician
Presbyterian Hospital

THE diagnosis of pancreatic disease is usually a matter of the greatest difficulty and any symptom sign or test which is suggested as an aid to our diagnostic equipment should be given a thorough trial before it is accepted or discarded.

Great assistance has already been given by the laboratory worker for the most part from the study of the feces though strangely enough the urine has been grossly neglected. Glycosuria has been urged as a symptom of pancreatic disease but its absence in the majority of cases robs it of any diagnostic importance and the same may be said of the other almost forgotten urinary findings.

In the Arris and Gale Lecture for 1904 Cammidge¹ reported the result of his extensive research on pancreatic disease and described a new laboratory test which he claimed to be of great value in diagnosing pancreatic lesions. Based on the fact that acute and gangrenous pancreatitis are usually associated with fat necrosis and chronic pancreatitis not infrequently Cammidge believed that even in the latter condition when there was no visible sign of fat splitting there might still be some change in the chemical composition of the blood. This change he believed might be due to glycerin but after a few unsatisfactory examinations of the blood for this substance or its derivatives he devoted his attention to the study of the urine. At this time he made use of two tests the A and B reactions. Cammidge believed that in certain diseases of the

¹Read before the Philadelphia Academy of Surgery November 2, 1908.

pancreas the formation of crystals with the A reaction could be prevented by preliminary treatment of the urine with mercuric chloride, and this formed the basis of the B reaction

The very unscientific claims urged for the method by Cammidge, and the insufficient grounds for most of these claims, called forth a storm of criticism from subsequent observers (Ham and Cleland,² Schroeder,³ Gruner,⁴ Willcox,⁵ and Haldane⁶) and the pancreatic reaction as first described, has fallen into almost universal disrepute

To render the test free of the personal bias of the investigator, Cammidge⁷ has modified his reaction, making the technic a little more complicated, but at the same time making the result an absolute one. This third reaction has been named by him "improved method" or "C" reaction, and is the one I have used in the present series of cases

A portion of the twenty-four hours' urine, or a portion of the mixed night and morning specimens, is examined for albumin and sugar. If albumin is present it is removed by boiling with the addition of a few drops of acetic acid, cooled and filtered. The removal of the sugar will be spoken of later. To 40 c c of the filtered, albumin-free, acid-urine are added 2 c c of concentrated hydrochloric acid, and the mixture gently boiled on the sand bath for ten minutes following the first evidence of ebullition. A small flask, with a funnel as a condenser, is used for the purpose. After ten minutes' boiling the flask is removed from the sand bath, cooled in a stream of running water, and the contents made up to 40 c c with distilled water, 8 Gm of lead carbonate are then added to neutralize the excess of acid, and after standing a few minutes the flask is again cooled in running water, and the contents filtered through a moistened, close-grained filter-paper *

At this stage of the procedure, if sugar has been found on qualitative analysis, a portion of yeast is added to the clear filtrate, and the flask placed in the incubator over night. The next morning the solution is filtered and the test is continued

* I have found the most satisfactory paper to be Schleicher & Schull 589 Blue Ribbon

The acid filtrate is thoroughly shaken with 8 Gm of tribasic lead acetate and the precipitate removed by repeated filtration through a well moistened close grained filter paper. To get rid of the excess of lead 4 Gm. of powdered sodium sulphate are added the mixture heated on a wire gauze to the boiling point cooled in running water to as low a temperature as possible and the precipitate removed by careful filtration. Ten c.c. of the filtrate are put in a small flask made to 17 c.c. with distilled water and to this are added 0.8 Gm of phenyl hydrazin hydrochloride 2 Gm. sodium acetate and 1 c.c. of 50 per cent acetic acid. The flask is then fitted with a funnel condenser and gently boiled on the sand bath for ten minutes at the expiration of which time it is filtered hot through a filter paper moistened with hot water. The filtrate if necessary is made up to 15 c.c. with hot distilled water and the whole well stirred with a glass rod.

In well marked cases of pancreatic inflammation a light yellow flocculent precipitate should appear in a few hours but in less characteristic cases it may be necessary to leave the preparation over night before a deposit occurs. Under the microscope the precipitate is seen to consist of long light yellow flexible hair like crystals arranged in delicate sheaves which when irrigated with 33 per cent sulphuric acid melt away and disappear in ten to fifteen seconds after the acid first touches them. The preparation must always be examined microscopically as a small deposit may be easily overlooked with the naked eye and it is also difficult to determine the exact nature of a slight precipitate by macroscopical investigation alone. (Cammidge *loc cit* p 253)

The nature of the phenylhydrazin precipitate is unknown though Cammidge believes that the body is a pentose not preformed but obtained by hydrolysis. To quote his words (*loc cit* p 251) "We are not in a position to make any definite statements with regard to the nature of the mother substance from which the sugar is derived but our earlier experiments proved that it was not the so-called animal gum of the urine and the fact that a positive reaction has not so

fa₁, been obtained by the 'improved method' with the urine, from any but pancreatic cases, suggests that it is probably a body resulting from change in the pancreas, and possibly derived directly from that organ. The relatively large proportion of pentose-yielding material in the pancreas (2.48 per cent)

points to the pancreas as the most likely source. It cannot be denied, however, that the disintegration of other tissue may also at times influence the urine in this respect, and it has also to be remembered that the ingestion of large amounts of pentose-containing food-materials may also cause small quantities of pentose to be excreted in the urine. Therefore while we maintain that a positive reaction by the 'improved method' of performing the so-called 'pancreatic reaction' is strongly suggestive of inflammatory disease of the pancreas, we are not prepared to contend that it is pathognomic of pancreatitis."

Cammidge's present attitude toward his reaction seems to be a very fair one, as the last sentence of the above quotation indicates. He has made 250 consecutive examinations, of which 125 were negative. These negative reactions were observed in 50 normal cases, 92 miscellaneous cases concerning which no further information is given, 10 cases of gall-stone in common duct, 11 cases of gall-stones in gall-bladder, both conditions unassociated with pancreatitis, and 12 cases of cancer of the pancreas. Two cases of acute pancreatitis gave a positive reaction. There were no negative findings in cases of chronic pancreatitis *suⁱ generis* or of pancreatitis accompanied by gall-stones.

Control work on this "C" reaction has been slow in forthcoming, probably on account of the adverse criticism aroused by the previous reactions.

Watson⁸ in a series of 250 analyses from 120 consecutive cases found the reaction positive in such cases as acute and chronic pancreatitis, acute suppurative appendicitis and peritonitis, malaria (jaundice with epigastric tenderness) pneumonia (arteriosclerosis), alimentary glycosuria and constipation, duodenal ulcer and chronic pancreatitis, gall-stones in common duct (pancreas inflamed), pregnancy (alimentary

glycosuria) mitral stenosis (inflammatory disease of pancreas) uræmia colitis gout tuberculous enteritis constipation chronic nephritis cerebral hemorrhage exophthalmic goitre gastric ulcer malignant disease of stomach leukaemia chronic bronchitis arteriosclerosis nephritis simple catarrhal jaundice and lymphosarcoma

This is a startling variety of conditions and would tend to invalidate Cammidge's claims. Watson arranges the cases giving a positive reaction in the following three sub-divisions

1 A group in which there is a definite clinical or pathological evidence of serious organic disease of the pancreas for example acute and chronic pancreatitis usually associated with disease of the bile ducts

2 A group in which the reaction in the urine is associated with pronounced arteriosclerosis a condition usually accompanied by more or less sclerosis in different glands

3 A group in which the reaction is dependent on congestion and catarrhal conditions of the gland duct and substance with associated toxæmia for example advanced heart disease appendicitis pneumonia malaria and the like

Despite the many varying disorders which give a positive pancreatic reaction Watson believes the test will prove of great value to physicians and surgeons in the diagnosis and treatment of pancreatic disease.

Edgecombe⁹ publishes the report of an interesting case of mumps in which owing to abdominal pain and tenderness with vomiting an examination of the urine for the pancreatic reaction was undertaken. Cammidge himself conducted the observation and diagnosed an active inflammation of the pancreas based on a positive pancreatic reaction.

Schroeder¹⁰ found a positive reaction in chronic pancreatitis cancer of the pancreas cancer of stomach gall stones catarrhal jaundice tuberculous peritonitis and tumor of upper abdomen probably of pancreas. Negative findings were seen in chronic pancreatitis cancer of stomach abscess of pancreas gall stones (three of four cases) catarrhal jaundice (three of four cases) cancer of liver cholecystitis and pulmonary tuberculosis. His conclusions are as follows

1 It has been proved that inflammatory and destructive diseases of the pancreas may give rise to the appearance of certain as yet undefined bodies in the urine, belonging possibly to the sugars or related compounds

2 The reaction is not pathognomonic for disease of the pancreas in the clinical sense

3 Extensive clinical observation on the urine in pancreatic and other diseases must finally determine the value of the pancreatic reaction

In making my observations on the pancreatic reaction, I purposely chose to exclude examination of any normal cases, as Cammidge has reported 50 normal urines of which none gave a positive reaction. I have so far examined 62 individual cases. In several of these, control-examinations were made, which I have not enumerated. The majority of these cases were from the practice of Dr Musser, but additional cases were furnished me by Dr J B Deaver, Dr W Wayne Babcock, Dr Joseph Sailer, and Dr Warfield T Longcope, all of whom I wish to thank for their courtesy. Great kindness has been shown me by Drs Sailer and Speese in allowing me to study the urines of their cases of experimental pancreatitis. Full details of these are omitted, as the question of the value of the Cammidge reaction based on experimental and pathological work will be presented in a subsequent paper in conjunction with Dr Speese.

My series includes only abdominal disorders, and I have tried to select several cases presenting the same disease, as a means of control. The list includes acute experimental pancreatitis, acute pancreatitis, chronic pancreatitis, cancer of the pancreas, cirrhosis of the liver, cancer of the gall-bladder and liver, cholecystitis, cholangitis, gall-stones, cancer of the stomach including cases of mural, pyloric, and cardiac carcinomata, gastric ulcer, gastritis, hyperchlorhydria, gastropexia, enteritis, renal calculus, fibroid of uterus, auto-intoxication, and diabetes mellitus. These cases I have tried to arrange in a consistent table, but the combination of several diseases has prevented a systematic classification.

	N	Pos	Neg
Experimental pancreatitis (acute)	4	2	2
Acute pancreatitis	1	1	0
Chronic pancreatitis	2	2	0
Carcinoma of the pancreas	1	0	1
Carcinoma of the stomach and pancreas	2	1	1
Carcinoma of pylorus	3	0	3
Carcinoma of stomach wall	1	0	1
Carcinoma of cardia	1	0	1
Sarcoma of stomach	1	0	1
Gastric ulcer		0	2
Hyperchlorhydria	1	0	1
Gastropotosis	1	1	0
Gastritis		0	2
Cirrhosis of liver	10	0	10
Carcinoma of gall bladder	2	0	2
Cholecystitis	4	0	4
Cholangitis	1	0	1
Gallstones		2	0
Enteritis	1	0	1
Abdominal tumor of obscure origin	1	0	1
Renal calculus	1	0	1
Fibroid of the uterus	1	0	1
Auto-intoxication	2	0	2
Diabetes mellitus	14	1	13
Myocarditis	1	0	1

Of the 62 cases studied but ten cases gave a positive Cambridge reaction and in six of these the diagnosis of a pancreatic lesion was confirmed at operation. The case of acute pancreatitis died with all the classical symptoms of the disease and the diagnosis of the case of carcinoma of the stomach and pancreas was corroborated post mortem. The case of gastropotosis was sent me by Dr Babcock with symptoms suggestive of pancreatitis but revealing a markedly ptosed stomach on examination. As this condition was the prominent feature I have classed the case under this head but it is not unlikely that a pancreatitis may have been associated with the gastropotosis. The fourth case was a diabetic woman a private patient of Dr Musser who had been troubled for some time with irregular attacks of indigestion and constipation. Von Noorden¹¹ says "To make a diagnosis of pancreatic diabetes in the absence of symptoms referable to marked pancreatic lesion is most daring —and although this is very true the

question of the concurrence of pancreatitis with many cases of diabetes must be borne in mind, even though no symptoms are present (Herzog,¹² Ssobolew¹³)

Four cases of experimental pancreatitis were examined, two of which were positive and two negative. The two cases giving a negative reaction were found at autopsy to show barely discernible evidences of pancreatitis. The two positive cases were typical cases of acute hemorrhagic pancreatitis. Further work is being carried on in this direction, and will be reported in a later paper in collaboration with Dr Speese.

I have studied but one case of carcinoma of the pancreas *per se*, and this gave a negative reaction, agreeing with Cammidge's results. Of two cases of carcinoma of the stomach with metastases to the pancreas, one was positive and one negative, so of the three cases of pancreatic carcinoma, two were negative, giving a percentage of 33 per cent positive reactions. Cammidge found four positive reactions in 12 cases of carcinoma of the pancreas, or 33 per cent.

The finding of a positive pancreatic reaction in gallstones associated with pancreatitis is a common occurrence, according to Cammidge, but Schroeder found three negative reactions in four cases of cholelithiasis. My cases are not numerous, but confirm the report of Cammidge.

The cases of cirrhosis of the liver were studied with a special object in view, inasmuch as they were all cases in which an alimentary levulosuria has been found after the ingestion of 100 Gm of levulose. It has been stated by Steinhaus¹⁴ that the principal reason why cirrhotic cases are not able to utilize levulose is because of the common association of a chronic pancreatitis with the cirrhosis. This was based on post-mortem findings, but has not been generally credited, so it was thought of interest to examine all cirrhotic cases for the pancreatic reaction. As will be seen from the table, ten cases were studied, but with no positive reaction. This would seem to point to another interpretation of alimentary levulosuria, as was mentioned in my preliminary report before the Section on Medicine of the College of Physicians last January.

All cases of glycosuria were examined for the reaction, and in but one case was it obtained.

Conclusions—Of 62 cases studied but ten gave a positive reaction. In seven of these the diagnosis was confirmed by operation or autopsy. One case died with all the clinical symptoms of acute pancreatitis and in the other two a concurrent pancreatic lesion was not improbable. In no cases other than those presenting clinical evidence was a positive reaction obtained.

I firmly believe the test to be a very useful one and to mark a decided advance in the diagnosis of pancreatic disease. The technic is long and complicated and requires great care but is one that can be readily mastered and is within the scope of any clinician with facilities for laboratory work. Sometimes the end reaction is obscure on account of crystals forming which are not properly the osazon described by Cammidge but observation as to structure and their insolubility in 33 per cent sulphuric acid suffice to render the diagnosis less difficult.

The test is not pathognomonic and the discoverer himself has never had the temerity to claim this property for it but taken in connection with the clinical history and examination and a careful study of the feces the Cammidge reaction is strongly suggestive of inflammation of the pancreas.

NOTE.—Since doing this paper I have studied many more cases and have made between 150 and 200 examinations. The results of these observations are in harmony with the above conclusions.

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THE PREVENTION OF INTESTINAL OBSTRUCTION FOLLOWING OPERATION FOR APPENDICITIS

BY FORBES HAWKES, M D,

OF NEW YORK,

Surgeon to Trinity Hospital, Associate Surgeon, Presbyterian Hospital,
Consulting Surgeon, Nassau and St Joseph's Hospitals, Long
Island, Instructor in Surgery, Columbia University

It may safely be said, I think, that in this country each succeeding year has brought with it an increasing number of cases of appendicitis which have been diagnosed as such at an earlier period in the disease. With this advance in diagnosis has also come an increase in the number of cases that have been operated upon. In fact there is hardly at present a community of fair size that does not count among its numbers one or more surgeons who have operated a number of times for appendicitis. After having diagnosed the case properly, removed the diseased appendix, closed the wound with or without drainage as the case may be, and returned the patient to bed, there ensues for all surgeons a more or less anxious period lasting from several days to several weeks. Of the post-operative complications liable to occur during this period, intestinal obstruction and sepsis form a serious percentage.

A number of cases of postoperative obstruction in which the writer has been called in to operate within the last few years have led him to consider more closely the causes of this complication in these individual cases and the methods by which it may usually be avoided.

This postoperative complication is not an infrequent one—it varies from a fraction of one per cent to ten per cent or more according to the operator's skill and experience.

The obstruction is usually either (a) mechanical or (b) septic, or a combination of both. There is also a so-called

* Read before the New York Surgical Society, November 25, 1908

spasmodic form about which authorities differ greatly. The occurrence of this form is doubtless quite rare. It is not here considered nor is that resulting from mesenteric thrombosis.

a MECHANICAL OBSTRUCTION

As a postoperative complication this occurs less often than we would expect in the cases where the conditions would seem at first thought to be most favorable for it—namely in those of acute generalized suppurative peritonitis with the production of many adhesion bands. The reason that many cases of this kind are free from this complication is doubtless that here many of the loops are united to each other by the exudate while they are in a normal position and are thus held together for some time—the later process of absorption occurring pretty evenly over the various surfaces if the focus of inflammation has been removed. The comparative rarity of mechanical obstruction in cases of pyosalpinx and especially tubercular peritonitis where the greatest amount of adhesive material is often formed would tend to corroborate this view.

The type of case most liable to this postoperative complication seems to be that in which most of the peritoneal cavity is free from adhesions permitting unrestricted intestinal motion but where a few firm adhesions are formed after operation between the caput coli and an adjacent loop of small intestine. Gibson¹ in 1000 cases of postoperative intestinal obstruction found the small intestine involved in 95 per cent. McWilliams collected 86 cases of postoperative obstruction—all in the small intestine—69 following appendicular abscess.

The following cases are fairly typical of this condition.

CASE I.—E. W., 25 years of age, male. Had been operated on by his physician on Long Island for chronic appendicitis on June 15, 1907. Considerable inflammation had been found at the tip of the appendix which had to be dug out from its adhesions over the pelvic brim. The appendix had been removed and a

¹ Gibson, *Annals Surg.* Vol. 32, p. 425.

McWilliams, *Wash. Med. Ass.* 1905.

cigarette drain placed to the stump area. The patient had done nicely for a few days following the operation and the drain had been withdrawn and partially replaced. He had then begun to vomit occasionally, the intervals between the attacks becoming of shorter and shorter duration. The bowels which had moved well at first had become constipated and finally the enemata had returned clear, only a very slight amount of gas being expelled. The pulse rate had remained 80 to 100 and the temperature normal. Nine days after the operation the vomiting had become fecal. I saw him late this same day for the first time, he looked distinctly anxious, the pulse was about 100, with appreciable tension, the temperature was normal. The abdomen was moderately distended and a little tender, no mass could be felt. On listening to the abdomen with a stethoscope for several minutes only two very faint gurgles were heard. No peristaltic waves could be seen, there was no dulness in the flanks. On rectal examination no mass could be felt and the examination was not painful. A diagnosis was made of mechanical intestinal obstruction. Immediate operation was advised and accepted. Under gas and ether anæsthesia an incision was made (Dr Hawkes) to the umbilical side of his previous incision, through the outer fibres of the right rectus muscle. The peritoneum was not adherent here. There was no free fluid in the general peritoneal cavity. A twisted loop of small intestine was found adherent to the caput coli at the site of the drain, on the umbilical side of the caput. The bowel above the obstruction was dilated and thickened, below it was contracted and entirely collapsed. There were no adhesions to be felt in the pelvis or elsewhere in the abdomen. The twisted loop was separated from its adhesion area to the caput coli. Its adhesion surface was oval, of about one to one and a half inches in diameter. In a few minutes the contents of the bowel above were slipping past the area of previous obstruction and the diameter of the bowel below was distinctly increased. After the separation from the caput coli the affected loop was seen to lie directly under the recent abdominal incision, where it was allowed to remain. The cigarette drain was removed from the old wound and a small piece of rubber tissue was introduced into the outer part only of the sinus tract. The fresh wound was closed in layers, leaving in only a small piece of gauze as a drain down to the peritoneum. The patient made a good recovery. His vomit-

ing stopped and his bowels moved of their own accord within twelve hours and after that regularly. His convalescence was interrupted ten days following the operation by a small collection of pus which formed in the bottom of the pelvis (probably from a small amount of blood that had trickled down into the pelvis at the time of the second operation. This collection bulged toward the rectum his physician reported and was there opened by the finger. It went on promptly to complete healing. The patient was heard from six months later. He was then in perfect health.

CASE II—N. H. 20 years of age male. Had been operated on by his physician in New York City July 22, 1907 for gangrenous appendicitis. The abdominal incision had been made at the edge of the right rectus muscle. The appendix had been found behind the caput coli imbedded in adhesions and its removal had been a difficult one. After its removal drainage had been instituted through the abdominal incision. The patient had made a good recovery and his bowels had moved well for several days following the operation. Then he had begun to have abdominal pain with constipation and had vomited occasionally. On the ninth day following the operation he had begun to have fecal vomiting the rectal enemata had returned clear and no gas had been passed by rectum. The writer saw him about twelve hours after his fecal vomiting had begun. The clinical picture was almost precisely that described in Case I. Diagnosis was made of intestinal obstruction from a loop of small intestine adherent to the caput coli at the site of drainage and immediate operation advised. Consent to this was not obtained for about six hours. Under gas and ether an incision was then made (Dr. Hawkes) to the umbilical side of his previous incision through the fibres of the right rectus muscle. The peritoneum was not adherent here. A condition almost identical with the one described in Case I was found—a loop of small intestine twisted and adherent to the caput coli at the site of drainage to the umbilical side of the caput by an irregular shaped surface—distention and thickening of the loop above the obstruction collapse below it. After separating the loop it lay directly under the fresh incision where it was left after its contents were felt and heard to slip downwards past the area of previous obstruction. The abdominal wall was sewed up in layers a small gauze drain being inserted

through the muscles only. The patient made an excellent recovery. The vomiting stopped almost immediately. The bowels were moved by enema on the third day and after that regularly. His convalescence was uneventful and he left the hospital in excellent condition.

In both of these cases the obstruction in the loop of small intestine was not at the site of the appendix stump, but corresponded to the area on the umbilical side of the caput where gauze drainage had been instituted. The prevention of the firm adhesion material or band formation in this locality may best be affected by

a Making the operative entrance into the peritoneal cavity well out towards the anterior superior spine of the ilium directly over the caput coli

b Instituting right iliac fossa drainage when necessary to the outer side of the caput coli

c Instituting pelvic drainage likewise when necessary to the outer side of all intestinal coils, by means of a suitable drain, the drainage tract having for its outer wall the lateral parietal peritoneum of pelvis and of right iliac fossa

d Protecting the coils of small intestine by means of an omental barrier

a The Abdominal Incision—By making the abdominal incision an oblique one from one to one and a half inches within the anterior superior spine of ilium (see Fig. 1) and by splitting the fibres of the external oblique in the same line as the skin incision, a retraction of the outer part of the external oblique aponeurosis will expose the internal oblique muscle nicely, the fibres of the latter are then separated and the transversalis fascia and peritoneum divided halfway between the outer edge of the rectus muscle and the anterior superior spine of the ilium. This will in most cases give an opening into the peritoneal cavity directly over the caput coli. If one attempts to open quite near the anterior superior spine, the result may well be that the dissection will lead down ineffectually into the retroperitoneal tissue, leaving a pocket there for postoperative trouble, or the bowel may be opened without

getting into the general peritoneal cavity. If the opening be made too far out at the edge of the rectus muscle a coil of small intestine may present itself instead of the caput. This is an objection.

b The Proper Placing of the Drain to the Stump Area in the Right Iliac Fossa—This I consider to be of great post operative importance in the cases where drainage is needed. Through such an opening as is recommended above a drain when indicated can be so placed that the secretion will be led up along the outer side of the caput coli and then into the outer dressings (Fig 1). A drain placed to the inner (i.e. umbilical) side of the caput coli in apposition with coils of small intestine (especially if it be a gauze drain) will of course cause marked adhesion formation and may well give rise to the complication existing in the two cases previously mentioned.

In the gangrenous cases where in addition to the gangrene of the appendix there are spots of juxtaposition gangrene on the caput coli or small intestine a piece of gauze either as a separate drain or as a part of the distal end of the stump area drain should of course be placed against such spots. Such a drain should however be surrounded by rubber tissue throughout the rest of its course in the wound and it should also be led to the surface to the outer side of the caput. It is hard to lay down exact rules as to the amount of drainage necessary in every drainage case. Clinically the principle here enunciated seems sound one thing also seems certain the lower abdominal and pelvic peritoneum in the male cannot take care of infection as does this organ in the female and requires as a rule provision for more ample drainage. Rubber tissue and gauze cigarette drains without gauze projection from the lower end unless there be a gangrenous spot to cover represent to my mind the best form of drain for the average case that requires drainage.

c The Institution of Pelvic Drainage—When the pelvis is to be drained the pelvic drain should preferably be of rubber tissue and gauze the rubber tissue being wrapped around the

gauze loosely, leaving likewise no gauze projection from its lower end. In this way the greatest amount of drainage with the minimum amount of adhesion formation is secured. This drain should always be introduced (under the guidance of the fingers of the other hand) so that it lies directly against the outer pelvic wall from the abdominal incision down to the very bottom of the pelvis. The failure to introduce such a drain to the very bottom of the pelvis may result in the formation of a pool in Douglas's or in the rectovesical pouch, which may in time give rise to further peritonitis causing mesenteric thrombosis or intestinal obstruction. This pelvic drain needs as a rule to remain in the pelvis not more than thirty-six hours in a comparatively recent case of spreading peritonitis with serum only or slightly turbid seropus in the pelvis. In the older cases, however, associated with heavy and scattered lymph plaques in the pelvis and localized pus collections there, a more prolonged pelvic drainage is indicated. In these latter cases a too early discontinuance of the pelvic drainage may be followed by pelvic re-accumulation of pus with subsequent intestinal obstruction. Cases with a perforated gangrenous tip located deep in the pelvis should be similarly drained. Localized collections of pus anywhere in the abdomen are inviting areas for intestinal obstruction. When it is possible it is advisable to open these so that the gravity drainage from them will be along the tract of the pelvic drain. Should this not be feasible they should be drained through that portion of the anterior or lateral abdominal wall which is nearest to them.

Retrocæcal or retrocolic abscesses may best be drained usually through an additional counter opening in the flank (see Fig 1). Here on account of the position of the abscess plain gauze may be used as a drain or preferably a cigarette drain of gauze enveloped in rubber tissue but with an inch or so of gauze projecting from its lower end. The gauze portion soon becomes adherent to the retrocæcal or retrocolic cellular tissue and thus prevents this drain from being extruded by the action of the lateral abdominal muscles. About the fourth or fifth

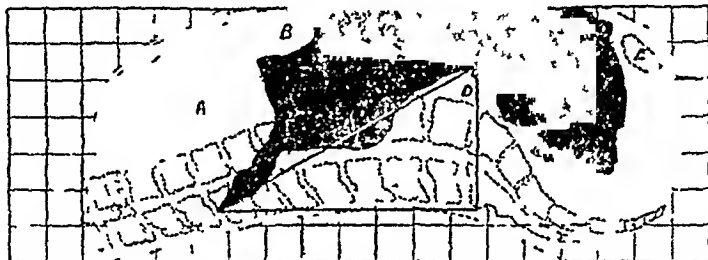
day such a drain may be removed with very slight discomfort to the patient. The writer does not feel that the introduction of sterile salt solution into the peritoneal cavity in cases of gangrenous appendicitis is advisable. Many of them have the gangrenous part of the lesion confined to the right iliac fossa or in a limited way to a small portion of the upper part of



the pelvis. Here the salt solution may scatter a secondary previously localized form of infection to other parts of the lower abdominal and pelvic cavities. When a drain is used it should never be nipped at its exit from the peritoneal cavity by too tight suturing. If so it acts as a stopper not as a drain. Of course the best way to prevent firm adhesion is to operate early if possible in cases of appendicitis at a time when drainage will probably not be necessary. When the condition

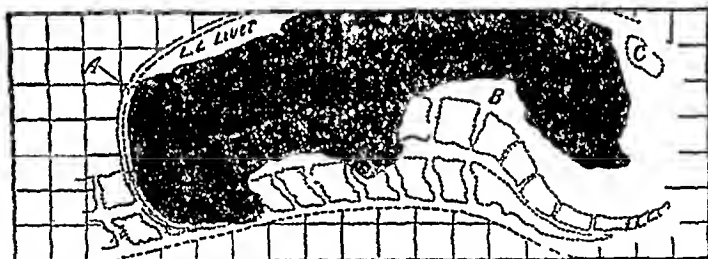
demands drainage, however, the lightest form of adhesion production with the greatest amount of actual drainage should be aimed at. And here while on the subject of drainage it is pertinent to recall that if we wish to drain other parts of the abdominal cavity which are not in direct contact with the capillary drain, yet not shut off from it by adhesions, we must

FIG 2



The right flank is here seen one inch deeper than the pelvis

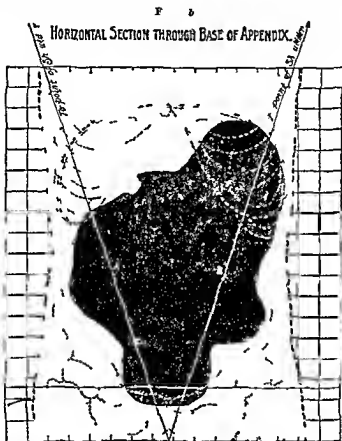
FIG 2 a



The left flank is here seen even slightly lower than the right

avail ourselves of the forces of gravity toward this drain. A complete emptying of these other parts into the drain should occur within the first twelve to eighteen hours after the operation, for it is exceedingly doubtful if any drainage occurs after this time (whatever form of drain be used) from portions not in contact with the drain. In the writer's experience the least irritating of all drains, the loosely rolled cigarette drain with rubber tissue covering without any projection whatever of gauze from its lower end, will drain adjacent regions perfectly (if adhesions have not formed in them before operation and if the fluid to be drained is not too thick) for twelve to eighteen hours, no more.

Fortunately this is often sufficient if the drain is of adequate size and the patient kept in the proper position in bed. The accompanying diagrams reproduced in part from Dr R C Coffey's article and showing the various fossæ to be drained



Consider g F g and F g b t g ther t will be seen that if the patient fir t turned o er on th right sid whil h h rro tal posit on nd th p t pin F wler position perf t gr vity drainag f all f sse may be secur d

explain at a glance the proper position in which the patient is to be placed for drainage in various classes of cases. For instance in cases of retrocæcal abscess alone without free serum or free seropus in the abdominal or pelvic cavities the dorsal position with lumbar opening in the right loin is indicated. In a case of retrocæcal abscess with free serum or free

seropus in the abdominal and pelvic cavities pelvic drainage and lumbar counter-opening with the Fowler position for about twenty-four hours is best Clinically the pelvis will by that time have drained off the serum or seropus that has gravitated from above and the patient may then be placed in the horizontal position, when the lumbar drain will continue its work, or the patient may from the start be simply turned over entirely on the right side, for in this position the lumbar and pelvic drains together, if properly placed, should drain the whole abdominal cavity above The former method, however, the writer believes to be the better one

The placing of gauze or of pads to the umbilical side of the caput coli in clean cases as a routine procedure during the operation seems to the writer to be a faulty technic, they are apt to cause adhesions, they often interfere with rapid and satisfactory manipulations, thereby causing delay, and they may very well produce displacement in the way of twisting of the small intestinal loops When removed they probably often pull the small intestinal loops into abnormal positions where they become adherent In the pus cases or in cases associated with great intestinal distention their use may be necessary, as few as is possible, however, should be used Their proper introduction is a very important matter They should be introduced only after the exact site of the caput coli and appendix region has been noted Care should be used that no coils be caught between them

A secondary infection of the peritoneum during the operation from the hands of operator, assistants, or nurses must be avoided Sterile rubber gloves should be worn by all The operator's gloves should be of the lightest weight to secure the greatest delicacy of touch, and the best appreciation of the exact pathological changes that have occurred in the operative field

The delivery of the caput coli outside the abdominal wound as a *routine* measure in hunting for the appendix is a procedure which is both unnecessary and injudicious In many cases the location of the appendix can be made out after

the peritoneum has been opened by introducing one finger to the lower part of the caput coli and exploring in this region. When thus located if there are softish adhesions they may be carefully separated by the finger until the appendix seems free and a small sponge or bit of gauze on a holder introduced below the appendix will then often deliver the appendix nicely into the wound without a single coil of small or large intestine displaced out of the wound. Even in pus cases the same steps may be carried out after the sponging out of the abscess cavity. Of more importance still than the retaining of the caput in the peritoneal cavity is the retaining of all small intestine coils; these are very apt to become displaced with the caput and to be replaced in a wrong position. All peritoneal surfaces of the bowel that are handled and exposed to the air for any length of time are traumatized thereby and the musculature more or less temporarily paralyzed. It is not at all unusual to see appendectomy cases where no portion of the intestine except the appendix has been brought out of the wound during the operation and where no pads have been introduced recover their intestinal tone within twelve to fourteen hours as evidenced by the passage of quantities of gas by rectum within sixteen to eighteen hours after the operation.

In women the pelvic drainage may be brought from Douglas's cul de sac through the vagina. There is a chance here however that a pool may form in the undrained fossa between the anterior surface of the uterus and the bladder. For this reason I prefer the pelvic drain which issues by the abdominal wound and by having the patient who is in Fowler's position turned well over occasionally on the right side this fossa will drain into the pelvis nicely. In the writer's experience young children who toss about a good deal after operation thereby secure for themselves unwittingly excellent drainage.

d Omental Protection of the Small Intestines—After the removal of the appendix (and the placing of the drain or drains if required) whenever possible a piece of the great omentum should be brought down from above and placed as a

barrier between the coils of small intestine and the stump site (see Fig 1)

This latter procedure is not practised by many surgeons. The writer's statistics in postoperative appendix work lead him to regard this as a very valuable prophylactic procedure, which he has made use of as a routine measure for a number of years. It simulates in a way nature's method of preventing the further spread of peritoneal infection and adhesion formation to intestinal loops. In most cases this omental protection can be effected. Where no omentum can be seen the appendix stump can often be placed under the fold of a divided meso-appendix, or under the ileocæcal fold, or a fatty tab from the caput can be brought over it.

It would seem that mechanical intestinal obstruction is of more common occurrence in cases of appendicitis which have not been operated on, than in those where operation has been properly done and the after-care of the wound properly carried out. In the former type of case the adhesions being often older are apt to be more firm and unyielding. They do not tend so much to be absorbed because the cause of the adhesion formation still persists. Old adhesion strings found in the abdominal cavity at the time of operation had usually best be divided close to their origin.

b SEPTIC OBSTRUCTION

In most of the cases of septic obstruction following an operation for appendicitis, this condition is but the result of the further progress of the sepsis that existed before the operation. The means to be taken therefore to prevent further spread of the septic peritonitis are the ones that should be used to ward off the secondary obstruction. In brief these are

- a* Removal of the appendix (if it can be done quickly)
- b* Free drainage of the inflammatory area surrounding the appendix site, in the way mentioned
- c* Free drainage of pelvis (if the infection has spread to it) according to the methods previously outlined
- d* All operative measures to be instituted with the greatest rapidity consistent with safety

e Assumption of Fowler's position directly after the operation (at an angle about 80°)

f Rectal instillation of hot normal saline solution *p o*

g Absolute intestinal rest by withholding all food and medication by mouth for 36-48 hours

h Stimulation as indicated

i Careful post operative wound treatment

j If the above are not sufficient then ileostomy

In a case of spreading septic peritonitis following the operation as soon as the diagnosis is certain if the free drainage above mentioned is insufficient the surgeon should not await the advent of fecal vomiting but should open the loop of small intestine which is nearest to the caput coli in the wound a rubber drainage tube of suitable calibre should be introduced into the proximal loop and retained therein by a purse string suture Should this loop be not adherent at the time to the surrounding surfaces a small piece of gauze should be placed around the suture line to produce protective adhesions The resulting fistula may be closed later after the bowel has regained its tone The following case demonstrates the value of this method

T B 50 years of age dentist had a mild attack of appendicitis in 1906 from which he recovered nicely he was laid up at that time for only a day His physician advised him to have his appendix removed in the interval but this advice was not followed On May 2 1907 he was seized with vomiting and abdominal pain His physician saw him soon after the onset and found temperature and pulse rate normal very slight abdominal tenderness and scarcely appreciable right rectus rigidity his bowels moved well by enema Within twelve hours however his pulse rate had advanced to 96 his temperature to 101° F and he presented distinct rigidity over the right rectus and lateral abdominal muscles with exquisite tenderness over the appendix site shortly afterwards he had a chill Rectal examination was negative He looked badly The writer insisted on immediate operation and found a gangrenous appendicitis with a septic peritonitis confined to the right iliac fossa The intestinal loops there seen were covered with lymph flakes and the right iliac

fossa contained a turbid yellowish serum. The appendix was rapidly removed and a rubber tissue and gauze cigarette drain of fair size placed to the stump area. During the first thirty-six hours after the operation the patient did not do well, vomiting occurred at intervals, at first mucous, then fecaloid, but not containing any fecal material, the abdomen became quite distended. No gas was passed by rectum. His septic peritonitis was evidently progressing and it was decided to institute freer drainage. The wound was opened, no mechanical obstruction was found, but a considerable amount of brownish-gray fluid with a foul odor around the bowel loops. This was sponged out and three cigarette drains were inserted, one above towards the liver, one to the stump area on the outer side of the caput coli, one into the pelvis on the right side along its outer wall. The patient was placed in Fowler's position. The vomiting, abdominal distention and absolute constipation, poor pulse, and general prostration persisted in spite of this free drainage. Very rarely a weak gurgle could be heard with a stethoscope over the abdomen. There was still evidently a progressing paresis of the gut, so it was decided to open the nearest loop of the small intestine. This was done about sixty-six hours after his first operation, a rubber drainage tube being sutured into the proximal loop and gauze applied sparingly around the suture line for protective adhesion. This was followed by the expulsion of much gas through the tube and a little later of a large amount of foul smelling greenish material containing particles of undigested food which he had eaten more than four days before. Similar material was obtained after the operation by gastric lavage. Following this ileostomy the vomiting stopped almost immediately and in twelve hours the whole clinical picture had changed, the abdominal distention became less, the patient looked much better, the pulse was greatly improved. Within twenty-four hours the bowels moved with enema by the rectum with the passage of much gas, he then went on slowly to recovery. Later his ileostomy wound was closed.

Postoperative Treatment of the Wound—Where multiple or deep drainage has been instituted the proper replacement of these drains at needed intervals is a matter of great importance to the patient. It is the writer's practice on this account to give an anæsthetic as a rule for the first dressing

in these cases so that the proper replacement of the drains to the very bottom of the tract may not be interfered with by the reflex muscular contraction of the abdominal muscles which otherwise often force the adjacent intestinal walls into the drainage tract and also narrow its mouth. I believe that where possible the operator himself should do the first dressing. An assistant will often fail to carry in his mind the exact depth and direction of the various drainage tracts and a previously drained pocket may thus be left undrained. The value of a voluminous *damp* gauze dressing into which the ends of the drains are fluffed is beyond question and it is the writer's practice to change this every 8 hours for the first 2 days for it promotes free drainage in a marked way.

The giving of special drugs to produce marked intestinal motion or catharsis directly or within 2-3 days after operation has always seemed to the writer an inadvisable procedure. Nature splints the abdomen when it is endeavoring to rid itself of septic material that is present as shown by the presence of muscular rigidity. We should take our cue from this and keep the coils quiet for 4-5 days usually emptying the lower bowel by enema as required in the meanwhile.

ACCIDENTS IN HERNIA OPERATIONS.*

WITH ESPECIAL REFERENCE TO THE VESSELS

BY JOHN F ERDMANN, M D,

OF NEW YORK,

Professor of Surgery, New York Post Graduate Medical School and Hospital

IN presenting this subject I have incorporated only those cases occurring in the practice of members of this Society, being impressed with the fact that the majority are teachers in medical schools, and that all members must be Visiting or Assistant Visiting Surgeons to some New York Hospital. This latter being the case, accidents of this nature by the members of such a society will have a marked relative value to the teaching surgeons, and also be of marked interest as a factor in impending or prospective suits.

Consideration of the dangers during an operation for the radical cure of hernia, especially by the Bassini method, should include those of the bladder, intestines, vas deferens and the vessels. Reference only is made to the subject of injury to the vas, as no further serious outcome can result from this injury than sterility of the side of trauma, and even this can be obviated by proper suture of the divided structures, if recognized at the time of the operation.

The bladder is a frequent enough content of hernia, and is made so, often enough, by dragging the sac farther down than necessary to meet with the proper technic relative to this step. Although several cases have been reported to me by the members, this subject has received sufficient attention in the literature of the day without my recording these cases. The point in question was well made in a paper recently written (but not yet published) by Dr Roland E Skeel of Cleveland, and read by him before the American Association of Obstetricians and Gynecologists at Baltimore on September 24, 1908.

* Read before the New York Surgical Society, November 11, 1908

He further called attention to the fact that the bladder wall of the paraperitoneal variety of vesical hernia occasionally was so thin and lacked the usual vascular and muscular appearance of bladder tissue as to be mistaken for the sac wall of a hernia and incised before the true condition was evident further stating that the urine escaping from these incisions in several cases was taken for serum of the usual peritoneal variety He advocated the administration of methylene blue for several days before the operation in all cases where there was a suspicion of the possibilities of the bladder being in the hernial protrusion so that the colored urine escaping from the injured bladder would be recognized as such He further stated that some of the injuries one a case of his own were due to tying the ligature of the sac about a portion of the bladder that was evidently dragged into this region by pulling the neck of the hernial sac far out thereby producing the vesical hernia rather than having it at the beginning of the operation This production of a hernia of the bladder was demonstrated by me in doing a repair for a direct hernia three weeks ago While dragging on the sac to place a suture ligature the bladder fundus was observed for a length of one and a quarter inches to the inner angle of my wound Germane to this is the following — a portion of the replies sent me by Dr George D Stewart

Another danger that I do not think is sufficiently emphasized is that of wounding the bladder This is more frequently the case in femoral hernias of course but it is also to be seriously considered in inguinal hernia In two instances which I recall inflammation had caused adhesions of the sac to the bladder The latter was dragged out through the inguinal canal as a part of the hernial mass In two instances I have seen the bladder wounded and in one I have opened it myself

Two cases of injury to the bowel are reported to me by members of this society one in a large sliding or slipped hernia where the sigmoid was opened and subsequently sutured without any following evil result In the other the sigmoid was evidently grasped in one of the deep sutures as

a fecal fistula or artificial anus developed in a few days and continued for several weeks, with an eventual repair without secondary operation

Injuries to the femoral vessels in inguinal hernia are due to several important factors, among which are (1) an anomalous distribution of the branches, (2) the needle, (3) the suture material as a contributing rather than as a primary cause, (4) the method of passing the needle from above or from below, and (5) exposure, etc., of the ligament. Injuries to the femoral vessels in femoral hernia so far reported to me by members of the Society were of the vein, explained very easily by the relationship of the vein to the saphenous opening. The branches of the femoral vessels likely to be involved in passing the needle would be any of the ones above the profunda, and they are, from above downward,—the superficial epigastric, the superficial circumflex iliac, and the superficial and deep external pudics. The involvement of any of the above branches, except the superficial epigastric, would in a normally placed set of branches imply reckless suturing, and suturing not of the kind as described by Bassini. Two cases of injuries to the deep epigastric, supposed at first to have been the femoral, are reported to me by two of the members of the Society.

In my case reported below, in passing the needle from above downwards I cut off the superficial epigastric flush with the wall of the femoral, and more than likely took off some extra portion of the wall, as the subsequent dissection of the vessel preparatory to ligation showed a perfectly round opening upon the ventral aspect of the femoral the size of an ordinary silver probe, or about 2 mm. in diameter (see Fig. 1).

The Needle—All kinds of needles have been used, and I find upon collecting the returns from the answers to questions sent out by me to all the members, that the greater number use the ordinary Hagedorn. Some use a blunt needle, advocated some years ago as a preventative of the very class of danger under consideration in this paper. The needle in my case, without question, was the cause of my misfortune

Dr Gerster also claims the same cause in his case. The needle which was given me was a large full-curved so-called fistula needle or a powerful triangular surgical needle the edges being as sharp as a knife. Objection was raised to such a

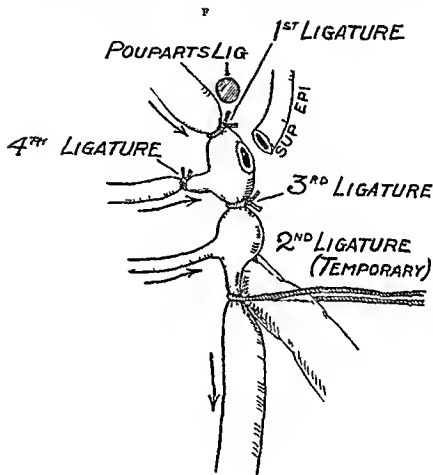


Diagram showing the relative positions of the inguinal artery and vein

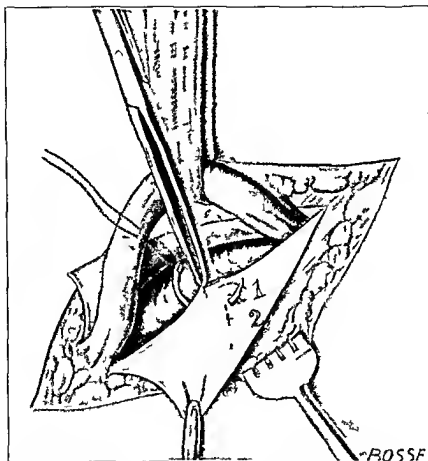
needle being given me but I was told that no others were obtainable from the department at that time and that the one I was given was the only one that would take the suture material a cord like one and a half mm kangaroo tendon. Although having misgivings but taking extraordinary precautions I used the needle passing it from above downwards

after having carefully palpated the pulsating femoral The point passed readily and was grasped by the needle holder A quick jerk to carry the large suture through was followed by a profuse flow of dark blood, which was suspected as coming from an injury to the femoral vein (see the history)

There is now no question in my mind that as the full curve and sharp edges passed through the aponeurosis the superficial epigastric was cut, say just below its base, from the femoral (see Fig 2—the needle passing around the dotted line representing the superficial iliac artery) The suture material, dense, large, hard kangaroo tendon, such as I was forced to use on my case, is without question a dangerous suture material, as the necessary tugging, etc, to make it pass through the tissue in which a needle puncture may have accidentally been made in either vessel will not tend to any other result than that of enlargement of the puncture, while a soft or small suture material might act as a hæmostatic in filling the puncture, and also in closing the opening by the final knot application

Passing of the Suture—No particular light is obtained by the answers received from the members addressed I can conceive only in an academic sense that the passing of the needle from above downward is less hazardous than in the reverse, that in passing the needle from below upwards one directs the point of the needle toward the wave pulsation of the vessel, while in the passing of the needle from above downwards one follows the stream, so to say, and the wave pulsation will cause the artery to strike the curve of the needle rather than the point, as in the method from below upwards I fully believe that if the ligament is grasped and carried well upward it is not material how the needle is passed (see Fig 2—forceps grasps the shelving border of the ligament and pulls it upwards)

The Ligament, Exposure and Traction Upon It—Unless the ligament be thoroughly cleared, and traction be made upon its shelving border, as shown in the illustration, the danger of injury to the vessels is intensified Should these arguments



Shows f cep gr pa g h h lvi g bo der f P part lgament to t act th sam
 as f po sbl from h sel lso h w th eedl bei passed from boy down
 w d and pass bo h hgh pl d pe fici l gas n () N rmal t f th
 superficial pig t ()

be true then as a prevention against these accidents it will be necessary to consider the needle the method of passing the suture the suture itself and finally such precautions in regard to the ligament as will give us the best picture of the shelving border and that which will give us the greatest room between the ligament and the vessel

The Needle—Although a goodly proportion of the Society use the Hagedorn needle I cannot but feel that safety will be enhanced by the use of a round needle with a sufficiently large eye to take the suture material

Passing the Suture—In passing the suture one can follow down the artery with less danger of having the artery transfix itself upon the needle than by passing the suture from below upwards The suture material should be soft and pliable not stiff and wiry

The Ligament—Clearing away all areolar tissue having the field perfectly dry from blood so as to be able to observe the glistening interior surface of the aponeurosis and then grasping the shelving border in a pair of forceps (see Fig 2) preferably applied over the site of the femoral vessels which have been previously well defined by the palpating finger and then passing the suture as advised above will I believe minimize the danger of injuring either the vein or the artery in this operation

TREATMENT OF THE INJURED VESSELS

The Vein—In this structure our ill luck has a fortunate side to it We can ligate laterally and should the injury be too large for ligation suture can be done much more readily than in cases of arterial injury

The Artery—Lateral ligation is out of the question and either suture of the vessel or allied methods of arteriorrhaphy of Brewer and Halsted or ligation distal and proximal to the injury must be done

There were forty-one responses by the honorary and active members of this Society to fifty two requests sent out

Some of the members were out of town at the time the final statistics of the paper were made up. The following cases of injury in inguinal hernia are recorded

CASE I—Iliac artery, ligation after unsuccessful trial at suture, no untoward result

CASE II—Femoral artery in a male, ligature, gangrene, amputation, recovery

CASE III—Femoral artery (see history of my case)

CASE IV—Femoral artery, ligature, gangrene, amputation, death

By one member, three cases of the femoral vein. In two of these cases the bleeding was checked by tying the suture, while in the third a large hæmatoma developed in ten hours, requiring removal of the sutures down to the kangaroo tendon, and then firm packing being applied, was successful in checking the bleeding. None of these cases were seriously involved.

One member reports a case of injury to the deep epigastric artery, with ligature, and also one of injury to the deep epigastric vein with ligature. Another member reports two cases of injury to the deep epigastric vein, with ligation, supposed at first to have been of the femoral vein. He is not positive now, but thinks they were of the epigastric. Mass ligatures were used to check the hemorrhage.

Two other cases, authentic, of injury to the femoral vein, are reported to me as occurring in the practice of members from whom I have not heard. Both these cases are said to have resulted favorably.

In all these cases the injury was recorded as being due to the needle.

Femoral Hernia—No injury of the artery has been reported to me. The following are the instances of the vein being punctured.

CASE I—Femoral vein, ligature drawn checked the bleeding, no bad result.

CASE II—Femoral vein, nothing done, result perfect.

A complete history of my case is reported below. No cases are recorded from the literature of this subject.

CASE I—Dr John F Erdmann's service at Gouverneur Hospital, March 22, 1908. Mr A W, Norwegian, silver-

smith thirty nine years old entered the service for a radical operation upon a large right sided inguinal (direct) hernia. No medical events of note crop out in his history until he was of sufficient age to acquire a gonorrhœa. From the same period of his life he drank a bit more than might class him with the moderate alcoholic but not with the pronounced *habitué*. He does not recall the period of onset of his hernia but knows that he has had it for years and has never used any appliances for its cure or to retard its increase in size. For two months previous to his admission he has used alcohol to excess and then found the hernia was a source of considerable discomfort. For a week he has had pains of varying degrees of intensity in the tumor which would extend occasionally to the lowermost portion of his scrotum and as a result of this pain he entered for treatment.

His physical examination revealed a heart hypertrophied and tumultuous in character. No other physical lesions except the hernia are found. The hernia is found to be a complete (direct) one of considerable size omental apparently and reducible in part only.

Operation on March 23. Owing to his late alcoholic habits and his heart local anæsthesia was used in the beginning. Upon exposure of the sac contents numerous and extensive adhesions were found. As these were likely to prove troublesome and the patient was becoming restless general anæsthesia with ether was given. The separate stages of the operation were passed over smoothly until the placing of the kangaroo tendon. A large fistula needle perfectly new with its triangular edges as sharp as a knife and measuring one and three quarter inches from tip to eye was given me threaded with a strand of hard wiry kangaroo tendon such as is supplied by the Bellevue and allied hospitals. Ordinarily I raise no objection to any needle passed me but this one appeared to me so absolutely an instrument of danger that I called the assistant's attention to it and requested a different needle. It seems that just at this time we were suffering from a dearth of needles and an inability to obtain more. This was forcibly brought to my mind by the assistant's reply that no needle in the hospital but the one given me would carry a tendon for suture. Bearing in mind the dangerous type of needle and also the anatomy of this region

I was more than careful in palpating the site of the femoral. With a remark to the Staff that the femoral was under the finger I began to pass my suture from above (proximally) downwards. The point engaged below and emerged above without giving any evidence of blood, but upon drawing the needle through and giving a sudden jerk to pull the kangaroo through, there was a fearful gush of dark blood. I thought that the femoral vein was punctured, and so expressed myself. Tying or drawing the tendon did not diminish the current of blood. Finger pressure was made and Poupart's ligament cut over the course of the vessel, and an incision made down the thigh over the vessels for a distance of three and a half inches. A careful but rapid dissection was then made and a clamp applied in a pool of blood to the vessel. It was now noted that our artery was at fault, and incidentally the anæsthetist, as our black blood was due to his prodigality in administering the ether. A proximal ligature was applied, but before tying the knot traction was made with pressure on the ligature loop. This controlled the hemorrhage sufficient to allow orientation. The loop was slipped as near as practicable to the opening, and then tied. A distal loop was applied below the forceps and pressure made as in the former instance, and the clamp was then removed. It was now found that hemorrhage continued in a stream, of several inches in height direct from the anterior surface of the femoral artery, demonstrating a good collateral supply at this point, at least, from the rear. Dissection showed a large branch, evidently anomalous, passing from the femoral directly behind the point of injury, and that the site of injury was without question that of the superficial epigastric, the opening being rather larger than usual, and I should say, higher placed than ordinary, being practically under the ligament rather than a few lines below. (See Fig 1.) My distal ligature was then placed proximally a full one-sixth inch more, as another posterior branch was found between the former site of the ligature and the source of collateral circulation. The ligature was then tied and the temporary one removed, a ligature was tied about the posterior supply source, and the wound closed with as near typical repair of the hernia as possible. Considerable blanching of the extremity was observed, but we were sure that some circulation was evident throughout the entire extremity. All proper precautions for

warmth etc were observed No complaint by the patient upon his recovery from the ether

March 24 pulse felt by some of the Staff in the femoral foot warm circulation apparently perfect but not up to normal No complaints from the patient except such as ordinary hernia patients make wonders why his leg and foot are so carefully protected

April 1 circulation good absolutely no untoward evidences

April 24 patient has been kept on his back longer than the usual hernia case by two weeks The reasons are evident Discharged to-day perfectly well

Called for examination on October 4 hernia recurred to slight degree no trouble

Comments—I feel quite satisfied that this injury was caused by the needle sweeping about or around a high placed superior epigastric artery and as a result of using a large and sharp needle its inner edge cut this vessel from the artery and in so doing cut it off at its funnel expansion of origin from the femoral that had I had an ordinary round needle or even a Hagedorn the delivery of the needle from behind Poupart's ligament would not have been followed by injury further than that of including the epigastric in my ligature That had it been in the artery or vein the pulling through of the ligature material would have very markedly enlarged the opening That a suture of the artery was not practical here for more reasons than that of lack of proper needles for this work That owing to anomalous branches posteriorly which apparently corresponded to the anastomotic branches of the circumflex etc from the profunda a better collateral circulation was present after the ligation and saved in its entirety our patient's limb

A NEW CYSTOSCOPE FOR CATHETERIZING THE URETERS BY THE INDIRECT METHOD.

BY PAUL M PILCHER, M D,

OF BROOKLYN, N Y,

Surgeon to the German Hospital, Cystoscopist to the Jewish Hospital

ALTHOUGH there are many types of cystoscopes offered for sale, still there are but few distinct types which can claim originality in their construction Kelly has perfected the method of using endoscopic tubes in women, but this has its limitations even in his restricted field

Nitze devised a cystoscope in which a catheter may be passed through the canal of the cystoscope into the bladder and then, by means of a mechanical device, the direction of the catheter may be so guided that it passes into the mouth of the ureter

Brenner presented a cystoscope in which it was not necessary to change the direction of the catheter after it passed through the cystoscope, but the cystoscope itself could be manipulated so that the catheter might be made to pass directly into the ureter mouth without becoming bent in its course

Tilden Brown, in 1898, devised a direct catheterizing cystoscope which was a great improvement over all other types of cystoscope of that class, and allowed the simultaneous catheterism of both ureters

Casper, of Berlin, in 1901, introduced an indirect double catheterizing cystoscope which was very cumbersome

Later Brown developed a composite cystoscope which combined a direct catheterizing device and examining telescopes, including a retrograde lens A year or two later, Lewis, of St Louis, presented a composite cystoscope which closely resembles the one devised by Brown

Two or three years ago, Bierhof, of New York, improved the Nitze cystoscope so that the sheath was constructed independently of the telescope which contained the lens and the

illuminating device without moving the sheath the telescope could be revolved within the sheath so that every part of the bladder might be examined This instrument which is made in Europe has certain distinct advantages

Each instrument which has been briefly described has certain disadvantages The Kelly cystoscope requires a large amount of experience for its proper manipulation and even in the hands of those who have used it most the results obtained with it are not so satisfactory as those obtained by other methods In the female for removal of foreign bodies from the bladder and for local applications for the bladder it is far better its size and the consequent dilatation of the urethra which it occasions are very decided disadvantages it cannot be used in the male

The Nitze which is an indirect cystoscope is a very attractive instrument but it too has certain disadvantages first it is large second if it gets out of order it must be sent to Europe for repairs third it employs a hot lamp and there is constant danger of burning the mucous membrane of the bladder fourth it is impossible to irrigate the bladder and change the medium therein without removing the instrument from the urethra though it may be done after a very awkward and time consuming manipulation of the instrument fifth the lens cannot be cleansed if soiled sixth it is almost impossible with safety to withdraw the instrument from the bladder and leave the catheters in place because of the direction of the catheters themselves in passing from the canals in the cystoscope to the ureters as they are curved in their course and are twisted on their own axis and bind between the cystoscope and the urethra and are subjected to so much friction that one cannot be sure that the catheter is not withdrawn from the ureter at the same time that the instrument is withdrawn from the urethra seventh the lever which directs the course of the catheter may easily become locked so that it does not lie flat upon the instrument and serious injury may be done to the mucous membrane and eighth the instrument is so constructed that the complicated parts cannot be removed by the physician and properly cleaned

The Bierhof instrument was a distinct advance and allowed the dismemberment of the instrument so that the component parts could be much more easily cleaned. There is one danger connected with his lamp-containing telescope, and that is, the joint between the lamp-carrier and the telescopic tube is so placed that if the beak of the instrument should become caught in the bladder wall, it would be possible, in turning the handle of the instrument, to unscrew the lamp and leave it in the bladder. A second point of disadvantage is the difficulty experienced in preventing the fluid from leaking out alongside the catheter, so that only one size of catheter may be used, also, the instrument presents the same difficulty found in the Nitze in removing it, the catheters are so twisted and bent that it cannot be done without the danger of pulling out the catheters from the ureters.

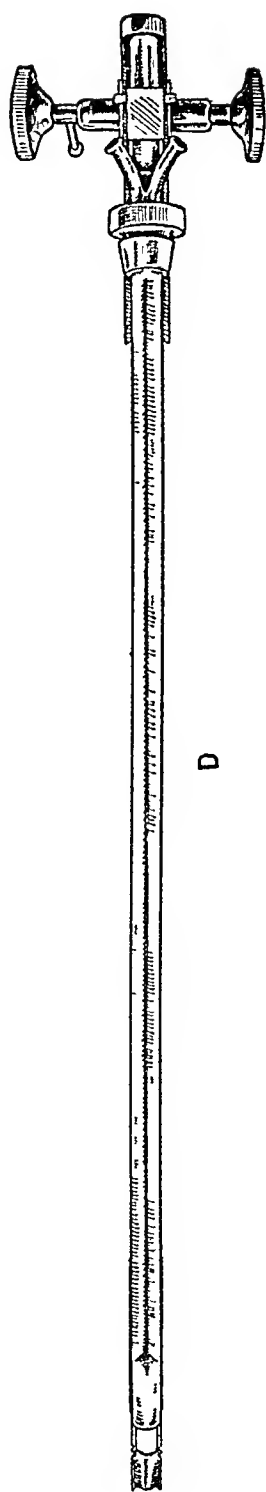
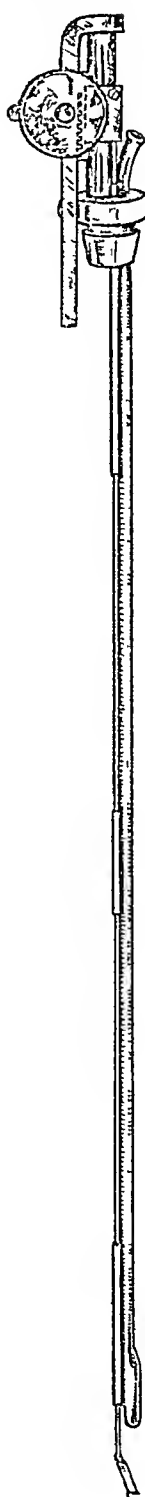
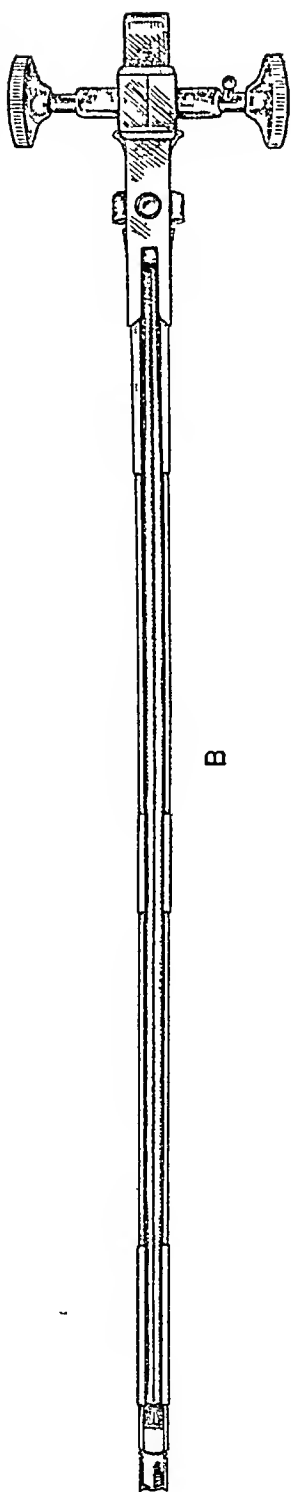
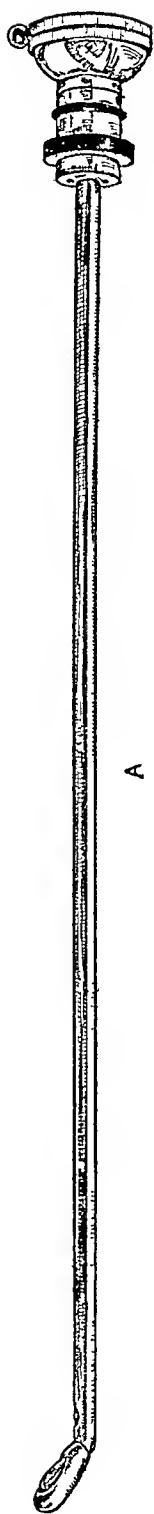
In the instrument devised by the writer, the aim has been to eliminate some of these disadvantages. First, the instrument is made up of three parts that may be disassembled and thoroughly cleaned, all excepting the telescope, containing the lens, may be boiled and sterilized as you would any other instrument. The telescopic tube (*Fig A*) is complete in itself, containing the lamp and lens, this may be used by itself as a simple examining cystoscope, its size is number 14 French. Attached to this telescope is the device which carries the catheter tubes and a new type of deflector, these catheter tubes may be open or closed as the user desires. The deflector consists of a simple piece of steel hinged on a pinion between two parallel steel-wire bars, as the deflector is advanced it strikes a slightly inclined plane that diverts its axis so that it assumes gradually a position at right angles to the instrument, its relation to the ends of the catheter-carrying device being such that the catheters are deflected to almost any angle desired, the tips of the catheters being, when properly advanced, always within the field of the lens.

Figure B shows a view of the superior surface of the part of the instrument carrying the deflector and the catheter tubes, *Figure C*, a lateral view, and *Figure D*, the inferior

view of the same. This telescope and deflecting device are contained within a sheath shown in *Figure E* the sheath is so constructed that when the beak containing the lamp is turned as in the Bierhof instrument the catheters projecting from their tubes lie horizontally and there is nothing to bind them or bend them in their course between the ureter openings and the tubes so the instrument may be withdrawn with the slightest resistance and friction. *Figure E* shows the sheath with the deflector out of sight. *Figure F* shows the sheath and the relation of it to the deflector. *Figure G* shows the vesical end of the completed instrument. *Figure H* the vesical end with the catheters deflected. *Figure I* the external end of the completed instrument that contains the irrigating tubes and the wheel for controlling the deflector and the electrical connection.

The advantages of this instrument over those previously devised are (1) that it may be properly sterilized after using (2) that a relatively large catheter may be used (3) that the deflecting device is so constructed that it cannot injure the urethra in the withdrawal of the instrument (4) that the bladder may be irrigated while the catheters are in place (5) that the opening of the sheath is so constructed that the catheter may lie flat in withdrawing the instrument and there is nothing to bind it as in other instruments which may be better shown in the last figure (*Fig. 1*) illustrating the catheter entering the ureter and the instrument prepared for removal. The illustrations give a fair idea of the construction of this instrument and after using it for a year the writer is satisfied with it for use in the female—the original instrument causing too much traumatism on the male urethra to be useful in men.

About six months after the construction of this instrument for the writer the same makers made for Dr. Buerger of New York City an instrument which shows some distinct improvements over the present cystoscope. The same opening in the sheath is retained and an obturator fitted to it that makes it easy of introduction in the male. The lamp is constructed as part of the sheath and is not connected with the

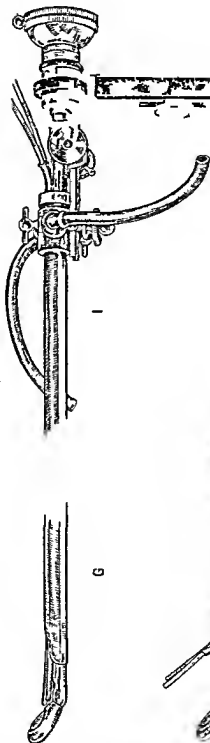




E



F



I



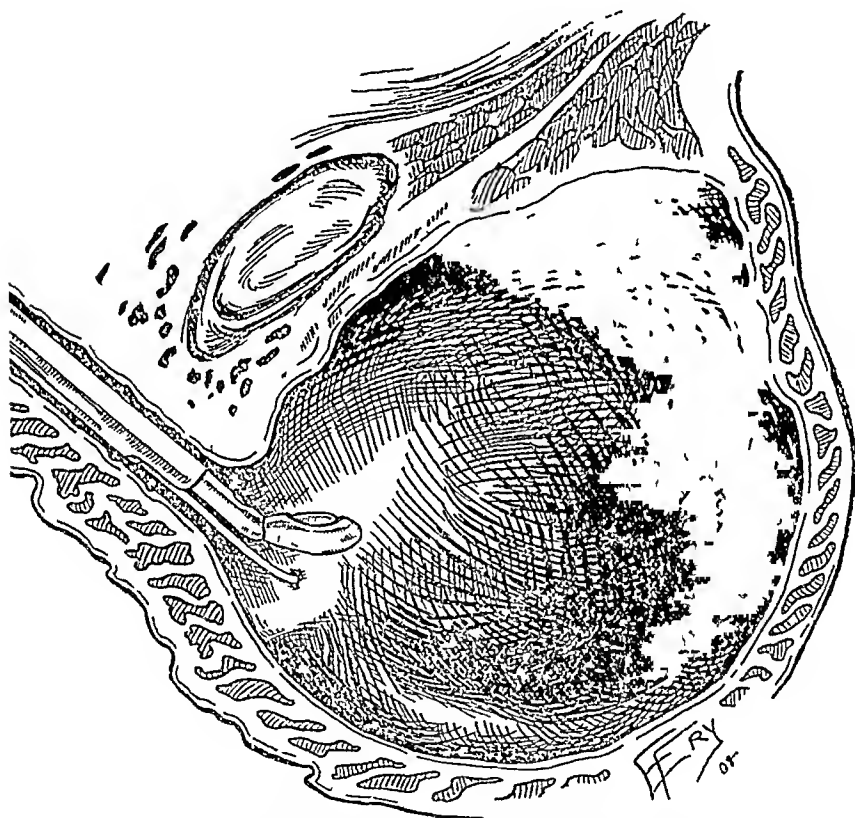
G



H

telescopic tube Both instruments are made by the Wappler Electric Controller Company, of East 87th Street, New York City, and while the instrument of Buerger is an improvement over that of the writer, still it presents the disadvantage which the writer has tried to overcome in withdrawing the instrument, leaving the catheters in the ureters

FIG 1



Showing the cystoscope in place, with the catheter in the ureter preparatory to removal of the instruments leaving the catheter in place

The writer presents this instrument fully realizing its defects, but he believes that it presents certain new principles in the construction of the cystoscope which will eventually lead to the production of a practical instrument that will encourage more surgeons to use the cystoscope in the diagnosis of diseases of the kidney and bladder

A NEW INDIRECT IRRIGATING OBSERVATION AND DOUBLE CATHETERIZING CYSTOSCOPE

BY LEO BUERGER M D

OF NEW YORK

Assista t Adj ct S geo d Associat i S gical P th l gy Mt S l H p tal
Assoc t S geo Mt M rah Hosp tal Cystosc pi t
West Sid German D pensary

IN spite of the fact that a large number of modifications of the Nitze cystoscope have been offered to the genito-urinary surgeon during the past ten years we still do not possess an ideal indirect vision instrument which will permit of irrigation while the process of double catheterization is going on. About nine months ago Dr F Tilden Brown designed an indirect vision tele cope and catheter bed which could be attached to his composite cystoscope and which promised to fill this want. Working along similar lines but adhering more strictly to the original type of the Nitze instrument I have been able to develop an instrument in which the Brown sheath with certain necessary changes has been combined with the Otis telescope and the Albarran deflecting device in such a manner as to overcome most of the objectionable features possessed by the older instruments.

The instrument consists of three parts the sheath the obturator and the catheterizing telescope. The sheath is circular on cross section bears a very short lamp at its end measures eight and one-quarter inches in length and possesses a large fenestra or window behind the lamp. Its calibre is 24 of the French scale (Figs 2 and 3). Save for the lamp which points toward the concavity of the instrument and the window the sheath has much in common with that employed in Brown's direct vision cystoscope.

The obturator which closes the working aperture is perforated so as to allow irrigation even when it is in situ through the two lateral faucets in the sheath.

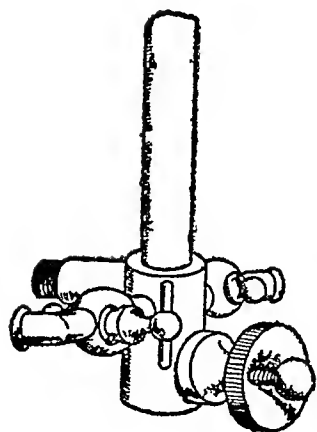
FIG 1



FIG 1a



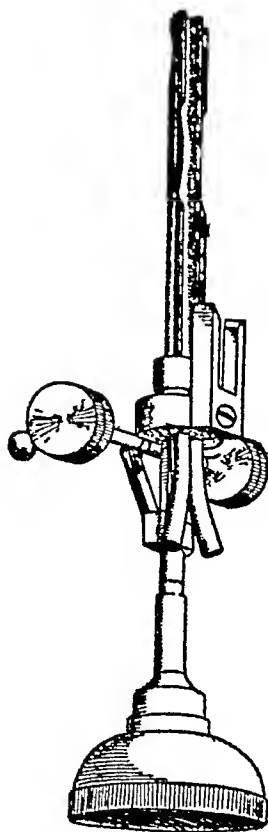
FIG 1b



Sheath



Obturator



Catheterizing telescope

1

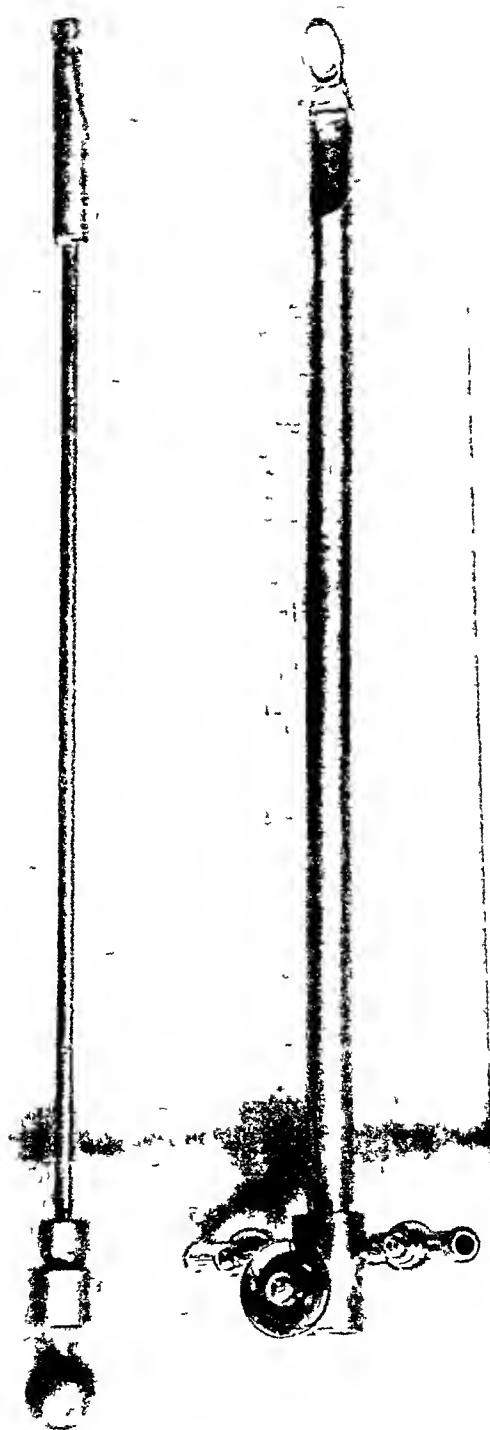


Section of the rock showing the structure of the mineral grains.

1



Cyt p h th th br t p^l



Cystoscope sheath and obturator



C h i t t g e t p w i t h e a t e i p l i i t h h i t h e d f l e (f) t a d d t h i u f f e d b y :

The catheterizing telescope combines in one piece the optical apparatus the mechanism for deflection (Albarran) and the catheter grooves or beds. A glance at Fig 1b will show that the telescope carries a double grooved bed upon its upper aspect. This is large enough to permit the lodgement of two number 7 French ureteral catheters. At the end near the lens this gives way to a closed ring in which the tips of both catheters are held secure. A large deflector or catheter lift is implanted between the lens and the ring and hinges on a small wedge which latter serves the double purpose of fulcrum and inclined plane for giving the catheters their primary deviation. All the parts are exposed so as to permit easy cleansing and easy repair.



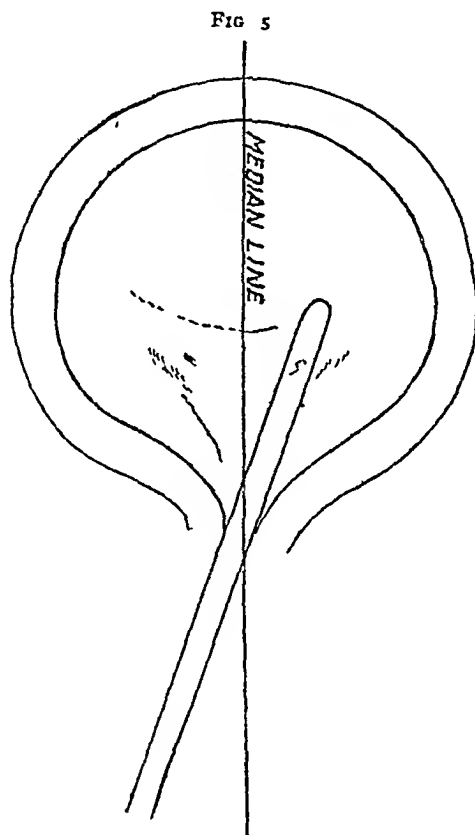
The technic of its employment is as follows. The sheath with obturator in situ is introduced into the bladder the obturator is then removed and the bladder irrigated through the open end of the sheath. After evacuation of the irrigating fluid the telescope with the two catheters in place is introduced. The bladder is now distended with the requisite amount of fluid through one of the two irrigating faucets. The catheterization of the ureters is effected in the same way as in the Nitzen-Albarran instrument.

It may not be amiss to give the details of a procedure for catheterizing the ureters which varies somewhat from that which is usually laid down in the text books but which has given me the most satisfaction.

1. The ureteral opening is found and the ocular end of the cystoscope is brought slightly to the opposite side of the patient. By raising the shaft the ureteral slit is made to occupy a point just below the centre of the field. *This position must be rigidly maintained during the next two steps.* It is

best to get a picture of the ureter which is about the normal size, this is obtained when the objective is at a distance of 1 to $1\frac{1}{8}$ inches (Figs 5, 6 and 7)

2 After the deflector has been slightly raised (just sufficient to prevent the catheter from hugging the lens) the



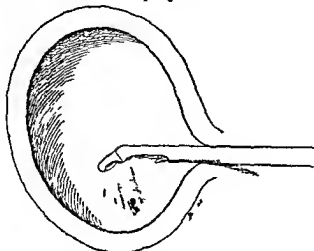
Position of cystoscope in normal ureteral catheterization

catheter is pushed forward about 1 to 1.5 centimetres beyond the limit of the field. Now the catheter appears enlarged, for it lies close to the prism (Figs 8, 9 and 10)

3 The deviation is gradually increased by raising the deflector, the movement of the catheter in the field being observed during this procedure. The tip of the catheter now comes into view, first appearing at the bottom of the field and gradually travelling upward, its size diminishing at the same

time When its tip is a short distance above¹ the ureter it is usually in the proper position in reality it then lies in front (nearer the neck of the bladder) above and slightly to the inner side of the ureteral mouth (Figs 11 and 12)

F 6



Normal ureteral catheter tip on first insertion cystoscope normal position

F 7



Cystoscopic view when seen through ureter somewhat below with the field of view as seen in Fig 6

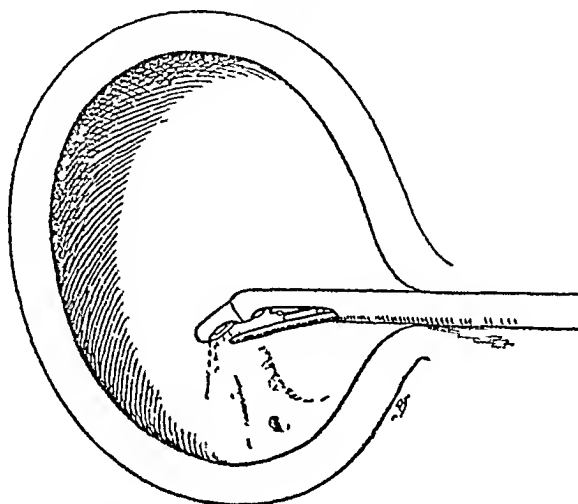
4 By now raising the shaft of the instrument and at the same time passing it further into the bladder the tip of the catheter is made to enter the mouth of the ureter² There

Apparently above—that is above in the field or if we wish to regard it so behind in the field

We must remember that when we raise the ocular the ureter seems to travel down the field when we push the instrument further into the bladder the ureter goes up the field Hence the degree of motion of the cystoscope into the bladder must exceed the lifting of the shaft in order to make the ureter meet the tip of the catheter

fore the cystoscope and catheter as a whole travel towards the opening and not the catheter alone (Figs 13 and 14) In the picture we see the ureter ascend to meet the catheter

FIG 8



Normal ureteral catheterization second move the tip of the catheter lies beyond the field

FIG 9

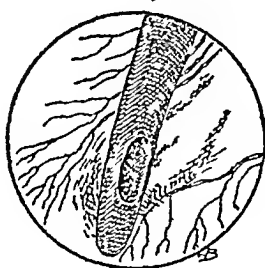


FIG 10

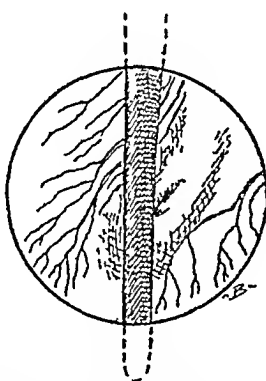
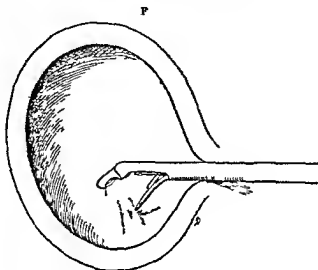


FIG 9 —Cystoscopic view the catheter is being pushed across the field
 FIG 10 —Cystoscopic view the catheter lies beyond the field view seen in Fig 8

at about the middle of the field When the catheter has engaged the ureteral opening it is pushed a short distance forward, the deflector is depressed somewhat, and, by still further raising the ocular, the introduction of the catheter becomes easy

The lid (deflector) is now turned down the other ureter sought and the same method employed

After a little practice we learn just how far to push the catheter before giving it the complete deviation^s The amount



Normal ureteral deflection the distance the catheter has been deflected full distance



Cystoscopic view the tip of the catheter as it enters the ureteral opening Fig

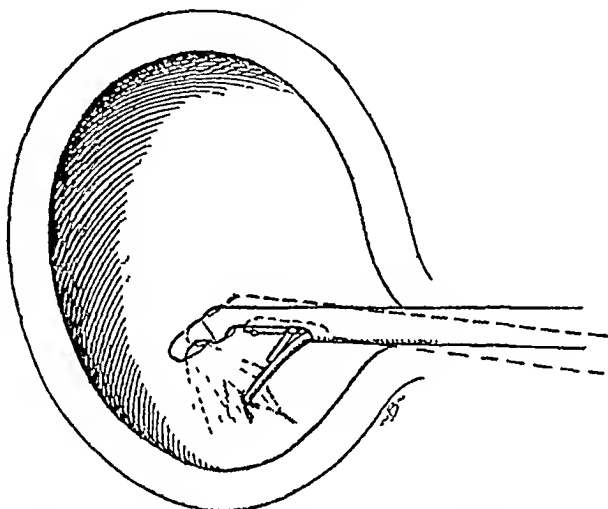
of unsheathed or exposed catheter must be such that the catheter tip projects about 1 to 2 centimetres beyond the level

The primary deviation must be very slight, just enough to prevent the catheter hugging the lens. Of course if the catheter be deflected too much at the start, then a much greater portion can be pushed out before it reaches the periphery of the field. In using the Nitze instrument I usually make the catheter pass 1 to 1.5 centimetres beyond the field (no primary deviation having been given) then deflect it as described

of the tip of the lamp. This leaves sufficient room for the instrument to travel, and the chances of contact between lamp and bladder wall are very slight.

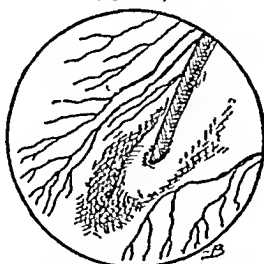
Although this may be considered as a normal method, certain variations in technic will be required in difficult or

FIG 13



Normal ureteral catheterization fourth move, by the forward motion of the instrument and the ascent of the ocular the tip of the catheter is made to enter the ureter.

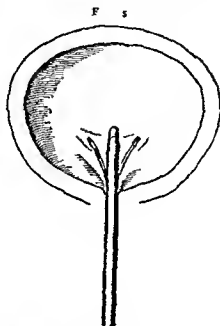
FIG 14



Cystoscopic view, catheter has entered, view in position, Fig 13

anomalous cases. Thus, we may find it advantageous to change the amount of deflection, or to retain the maximum deviation while pushing the catheter along the ureteral canal. If we see that the bladder wall is being raised considerably by the entering catheter, we know that the anterior wall of the ureter is being lifted up by the catheter. This occurs es-

pecially when stiff catheters are used and when the deflector has been turned down too far. For in both instances the catheter has a tendency to seek a higher level, one approaching the plane of the shaft of the instrument. To overcome this three manœuvres are permissible: either raising the ocular so as to bring the ureters more nearly in the direction of the ureteral canal, or increasing the deflection, or a combination of both.



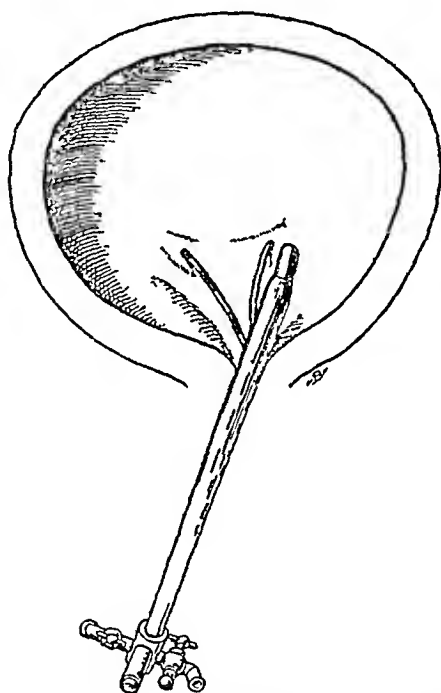
Removal of sheath first point on the telescope has been made the catheter is loose
the sheath

If carefully carried out this procedure is far superior to that by which the catheter is aimed at the opening and pushed out to meet it. It affords a more certain way of hitting the mark, avoiding scraping of the bottom of the bladder, and with the long deflector provided in the new instrument is extremely easy of execution.

The catheter bearing telescope and sheath have been so proportioned that even when two number 7 French ureteral catheters are being used sufficient space is left to allow irrigation of the bladder during the process of catheterization.

The following manipulations, will enable us to remove the instrument with ease, leaving the catheters in the ureters. After having introduced the catheters a little higher than we would if the instrument were to remain in the bladder, and after removal of the telescope, the following movements should be carried out first, the ocular is depressed and carried a lit-

FIG 16

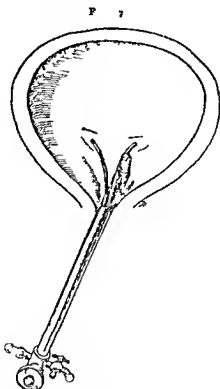


Removal of sheath second position with depressed ocular, the beak and catheters are disengaged

tle to the left, thus separating the beak from the line of the catheters (Figs 15 and 16), second, the whole instrument is rotated to the right on its longitudinal axis through an arc of 180 degrees, retaining the relative position just described, thus making the beak point upward (Fig 17), third (still in the same plane, with the ocular a little to the left), the ocular is raised and brought back to the median line in order to bring the convexity of the beak against the trigone of the bladder (Fig 18), and fourth, the sheath is removed, its

inferior aspect being made to hug the posterior wall of the urethra

Should we desire to use the cystoscope for observation only a telescope giving an extraordinarily large field can be inserted instead of the catheterizing apparatus. A retrograde vision telescope or a small telescope with operating instruments may be also substituted.



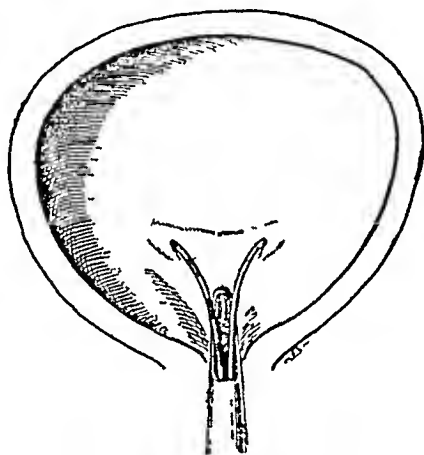
Rem 1 f beath the d position th beak turn d p

Some of the special features may deserve mention before we sum up the advantages of this instrument. First the small size of the lamp diminishes the likelihood of contact between lamp and bladder wall⁴. Second the distance between the distal end of the filament (which point corresponds

If we desire to use the instrument for observation alone a larger lamp may be screwed on this is not essential

to the brightest part of field) and the centre of the objective lens has been reduced as much as possible in order to attain the maximum illumination for any given sized lamp Dr F T Brown had already suggested this improvement for the Otis observation cystoscope Third, the large size of the deflector gives firm support to the catheters Fourth, the relative positions of the lens, deflector and margin of the window are such that catheterization is easy, the catheters always remaining in the field when properly deflected, and fifth, no difficulty

FIG 18



Removal of sheath the sheath is being removed

is encountered in deflecting the second catheter even when number 7 French catheters are employed

The advantages of the combined indirect irrigating observation, double catheterizing and operating cystoscope over others of its type may be summed up as follows

1 The employment of a catheter for washing out the bladder is not necessary, the sheath serving this purpose

2 Because of its small calibre (24 French),⁵ its round shape, and its smoothness in the region of beak and window, the introduction of the instrument is easy and injury to the deep urethra is avoided

⁵ If we are satisfied with the use of two No 5 or 6 French ureteral catheters, the instrument can be constructed so that its calibre is 22 French

3 It carries larger catheters than any other indirect vision cystoscope although its diameter is smaller Two number 7 French catheters pass with ease

4 The telescope and sheath may be removed leaving the catheters in the ureters

5 Irrigation of the bladder may be very rapidly effected by removing the whole catheter bearing telescope or by washing through the faucets in the sheath This may be continued whilst the process of catheterization is going on

6 By the employment of the grooved beds the catheters are separated in such a manner that friction between them is impossible a new catheter can be inserted at any time without removing the telescope This was borrowed from the improved Brown instrument.

7 The proximity of lamp and objective lens gives the best illumination for catheterizing purposes

8 The small size of the lamp makes the chances of contact with the bladder wall small

9 Inasmuch as the catheter bearing mechanism is separable from the sheath and is not introduced until the bladder is clean *the likelihood of carrying infection into the ureters is reduced to a minimum*

10 A large telescope for indirect or retrograde vision may be used in the same sheath

11 A small telescope will leave ample room for the introducing of operating instruments of various kinds

12 The addition of a correcting prism to the ocular produces an upright picture and enhances the brilliancy of illumination * (orthocystoscopy)

It gives me great pleasure to acknowledge my indebtedness to Dr Abraham Wolbarst Chief of the Genito-urinary Clinic at the West Side German Dispensary for his kindness in having placed much of his large clinical material at my disposal and further I wish to thank Dr F Tilden Brown for his kindly interest and encouragement

The instrument was constructed for me by the Wappler Electric Control Co with the efficient aid of M R Wappler

COMPLETE DENUDATION OF THE PENIS

BY CHARLES A POWERS, M D,
OF DENVER, COLO

ON the afternoon of November 17, 1907, F, a lad of six years, while escaping from an angry farmer, hastily climbed through or over a barbed-wire fence. He tore his clothes, sustained some scratches and on arriving home found that he had injured his penis. He was not seen by a physician until the following morning when Dr P V Carlin attended him, sent him to St Joseph's Hospital in Denver and kindly asked me to see him.

Upon examination it was found that the skin at the base of the penis, just at its junction with the body, had been divided through its entire circumference and to the deep fascia as cleanly as though with a knife, this division including a little of the scrotum. The skin of the penis had then been completely everted, stripped off and down so that it was hanging as an inverted tube at its preputial attachment. The condition is shown in Fig 1 the skin was, however, hanging at its mucocutaneous junction rather than at the site of the corona as shown in the picture. The artery of the frænum could be plainly felt. The boy had been urinating through this inverted tube, which, as said, had been peeled off much as one would invert the finger of a glove in removing it.

The vitality of this inverted skin seemed questionable, at its cut end it tended to slough. Under ether the parts were well cleansed, the questionable tissue cut away, and the inverted skin tube replaced on the penis. The abdominal and scrotal skin were dissected up a little and the edges approximated by interrupted horse-hair sutures.

About one-fifth of the skin at the base of the penis sloughed, this sloughing being rather greater on the left side than on the right. This condition is shown in Fig 2, a sketch made from life on the eighth day. The parts closed in easily and promptly by granulation and at the end of four weeks healing was complete. The foreskin gradually retracted over the glans. At the end of

the eighth week the condition resembled that following ordinary circumcision. Fig 3 shows a sketch made at this time. There was no constriction at the base of the penis the skin was fairly movable.

At this time one year after the accident the boy notices no inconvenience. According to his account carefully gained urination and erections are normal. There is no cicatricial constriction.

THE OPERATIVE TECHNIC OF CARCINOMA OF THE PENIS

BY JAMES H NICOLL, M B ,

OF GLASGOW,

Professor of Surgery in Anderson's College , Surgeon to the Western Infirmary

DURING the past fourteen years I have employed the following method of operating for removal of penile carcinoma. In November, 1905, in describing it to the Glasgow Pathological and Clinical Society (vide *Glasgow Medical Journal*, May, 1906), I made reference to the results in cases treated which had passed the three year period, and to two cases which had not. Of these two cases, one (patient sent by Dr John MacIntyre), in which there was extensive involvement of the deep inguinal glands, had fatal recurrence in the region of these glands within a year, the other (sent by Dr Jas Stevenson), in which the disease was in less advanced stage, is free from recurrence three and a half years after operation. During the past three years I have not seen a case of penile carcinoma, but within the past three months have operated on two in the Western Infirmary of Glasgow. The same method has been employed as in former cases. Its object is the removal, *en masse*, of the primary carcinoma, the fat and glands of the groins, and the lymphatic vessels intervening between primary growth and area of probable or actual secondary extension. This is, of course, the object of all modern operations for carcinoma wherever occurring.

In the penis, carcinoma is practically always an epithelioma originating on the surface of glans or prepuce, usually in the region of the corona.

The lymphatics of the anterior half of the penis pass almost wholly to the dorsum, the main channels passing back on either side of the dorsal vein to the oblique set of superficial glands of the groin, in the first instance, secondarily

thence to the deep inguinal glands lying along the external inguinal vessels on the brim of the pelvis. Few if any of the lymphatics from the anterior half of the penis pass to the deep lymphatic vessels of the root of the penis which channels pass under the pubic arch to the intrapelvic glands.

Epithelioma of the penis (prepuce and glans) like chancre in the same region primarily extends along the dorsal lymphatic channels on either side of the dorsal blood vessels and affects the glands of the groin and the deep inguinal glands along the brim of the pelvis. Only late in the progress of the disease does the growth infiltrate the corpora cavernosa and the posterior portion of the corpus spongiosum and thus reach the lymphatics which are under the pubic arch and through these the intrapelvic glands. When such infiltration of the proximal portion of the penis and invasion of the intrapelvic glands have occurred the case is inoperable in the vast majority of instances. For such advanced cases various extensive operations including the bisection of the scrotum and the detaching of the crura penis from the pubic arch have been introduced and may possibly be justifiable in a few cases.

The usual operable case of penile carcinoma presents a growth in the anterior fourth or third of the penis with possible extension along the dorsal lymphatics and involvement of the superficial glands of the groin and through them the deep inguinal glands along the external iliac vessels. There is no infiltration of the posterior part of the penis nor are the lymphatics under the pubic arch infected. Operative measures should aim at the removal of the anterior two-thirds or three fourths of the penis plus the dorsal blood and lymphatic vessels (with their surrounding connective tissue) back to the pubes and *plus* further the fat (and contained lymphatic glands and channels) of both groins. All the structures mentioned should be removed in one mass. In cases in which glandular involvement has extended under Poupart's ligament from the superficial inguinal to the deep inguinal glands these latter must also be removed.

The entire operation is carried out through a Y shaped

incision,—strictly a Y-shaped incision The steps in its execution are as follows

1 Having passed a sound, make the incision indicated in Fig 1 The “arms” of the Y extend along the folds of the groin—or along a line more or less parallel with that fold but somewhat above it—from a point at the root of the penis on the pubic crest outwards towards the superior iliac spine The “leg” of the Y, carried along the dorsum of the proximal fourth of the penis, terminates in the loop which constitutes the “foot” of the Y, which loop obliquely encircles the penis That loop is skin-deep only, the “leg” is carried more deeply, and the “arms” are ultimately deep wounds (see Fig 1)

2 Dissect out all fat and contained lymphatic channels and glands, *en masse*, from both groins Hemorrhage may be largely avoided by reflecting the lower skin flaps first, towards the thighs, thus securing at once the superficial epigastric, superficial circumflex and external pudic arteries and veins where they perforate the deep fascia These vessels once secured, the upper flaps are reflected and the whole fat of the groins rapidly raised *en masse* from the deep fascia lata of the groins and the aponeuroses of the external oblique muscles

In cases in which the step is indicated, next open the fascia lata just below Poupert's ligament, and, having exposed and opened the femoral sheath, and raised and repressed the peritoneum, remove the fat and glands along the external iliac vessels, pushing aside or tying the deep epigastric vessels

3 Dissect out the dorsal blood-vessels and lymphatic channels of the penis (with all surrounding fascia) leaving the sheaths of the corpora cavernosa bare on their dorsal aspect Tie the dorsal arteries and vein close to the pubes at the suspensory ligament of the penis The fat of the groins, and the fascia and vessels of the dorsum of the penis form one continuous mass containing the unbroken lymphatic channels

4 At the line of the loop-incision round the penis, pass the knife between the corpus spongiosum and the two corpora cavernosa, and divide the latter

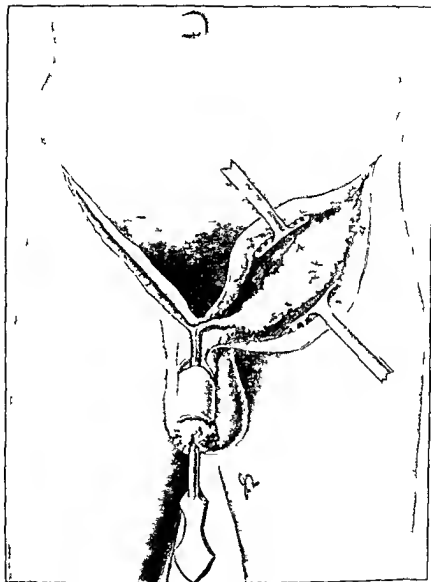
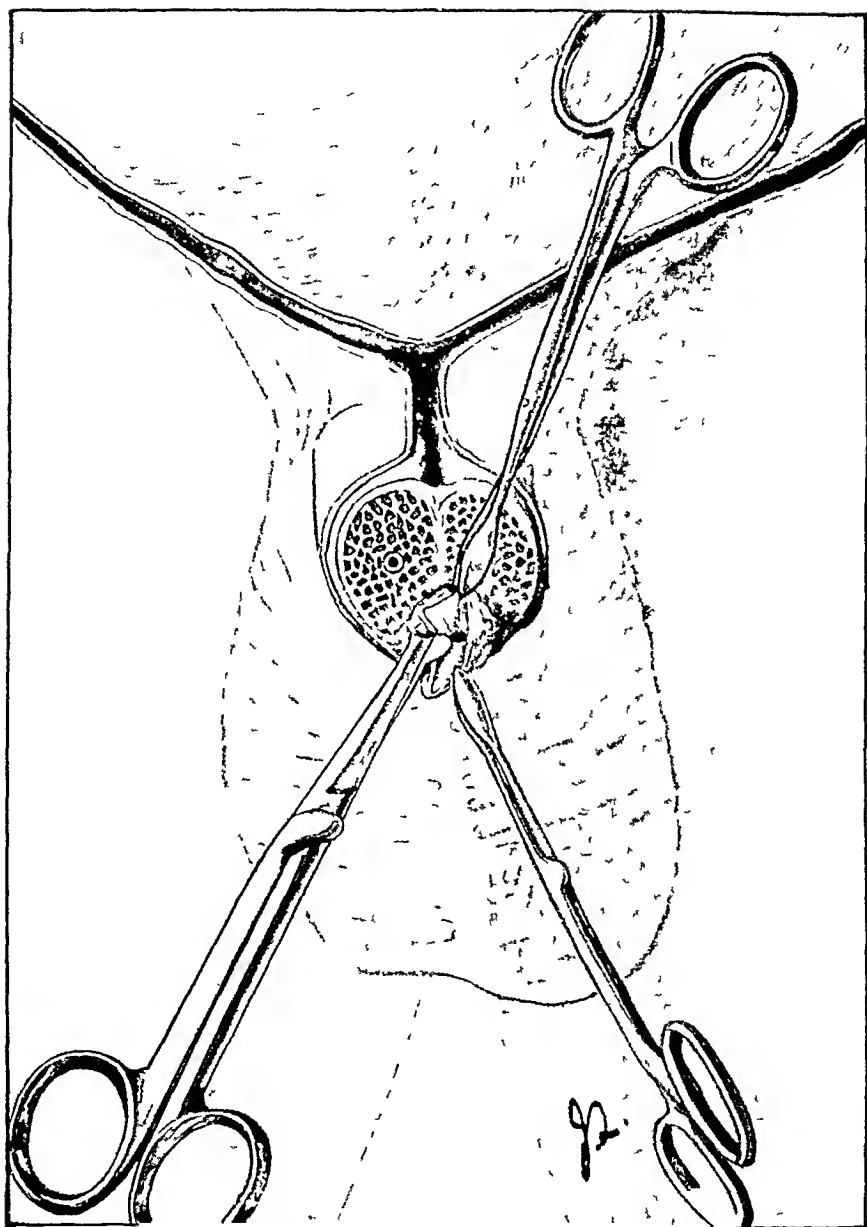
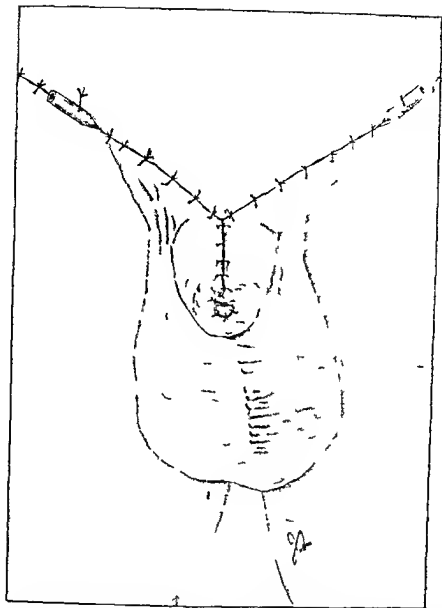


FIG 2



Penis removed. The corpus spongiosum is left longer than the corpora cavernosa, and is cut obliquely to leave the lower lip longer than the upper. The urethra and surrounding corpus spongiosum are shown in process of being split transversely.



W und t d b w gth l g po th k i f n l p f th ur thral f and th
 dra nage t be e ssary to provid f th lymph rhor h h ill th a
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 NOR —In pr ct th port n f th pen l ft h rt th indicat d th
 ill tration.

FIG 4



Photograph showing parts removed 1, anterior two thirds of penis, 2 and 2' fat and contained glands of groins united to penis by the vessels, lymphatics, and fibrous tissue of the dorsum of the penis

5 Withdraw the bougie and divide the corpus spongiosum. This should be done at a point somewhat anterior to the line of division of the corpora cavernosa thus leaving the spongy body and divided urethra rather longer than the cavernous bodies. Further it should be done obliquely to leave the inferior lip of the divided urethra longer than the superior (Fig 2)

6 Split the urethra and spongy body transversely to the extent of one third of an inch (Fig 2)

7 Secure the arteries of the corpora cavernosa and the arteries of the corpus spongiosum. No tourniquet is possible in the operation and these vessels will have been temporarily clamped by pressure forceps on division of the penis. In the application of the forceps time and blood are saved by clamping each vessel *en masse* with some of the surrounding cavernous tissue. Similarly the ligature should include all that is held in the forceps. The penile tissue is occasionally so friable that attempts to isolate these vessels fail. Where hemorrhage proves difficult to control by ligature (a rare event) it may be checked by encircling the cavernous body by a suture having a bite in the tough penile sheath. Preliminary ligature of the internal pudics is unnecessary.

8 Close the wound by suture as indicated in Fig 3. The oblique direction of the skin incision encircling the penis, the fact that the spongy body is cut longer than the cavernous bodies and the oblique division of the urethra itself all combine when the wound is sutured to the shaping of a meatal orifice with a spout like inferior lip a matter of prime importance in the subsequent comfort of the patient in micturition.

9 Drainage is necessary (Fig 3). One effect of the wholesale clearing of the fat and lymphatics from the groin is a lymphorrhœa through the groin wounds. This is usually sufficient to bag the wounds if undrained and may be excessive necessitating change of dressings several times daily. Such lymphorrhœa is unknown in the axilla after operation for mammary carcinoma.

extended on the flexor surface to the middle of the proximal phalanx, and on the extensor surface to the first interphalangeal joint. At the tip of the finger there is a blister containing serum, slightly blood-tinged. The skin over this blister is yellowish-blue. To the proximal side of the line of demarcation, the finger is swollen, red, very tense, and painful on pressure. This redness gradually fades to the normal color of the skin as the base of the finger is reached. Complete, superficial, and deep anæsthesia of the involved portion of the finger is present. On puncture with a needle in the involved area the tissue of the finger is found to be dry excepting in the region of the blister above mentioned. The patient was advised to have the finger amputated, but refused. A dressing of boric acid ointment was then applied with the understanding that the patient would return in two days for amputation if the condition had not improved. The patient failed to return to the clinic, but went to another hospital two days later and then the finger was amputated at the metatarsophalangeal joint.

Figs 1 and 2 show the flexor and extensor aspect of the involved finger.

That the condition is not a rare one may readily be seen from the reported cases in the literature. Honsell in 1897 reported 48 cases, Von Bergmann states that in 61 cases collected, the strength of the solution used was 1 to 5 per cent in 30 cases, and concentrated in 31 cases, Kortum reports that he has observed gangrene following the use of moderately concentrated solutions of carbolic acid, in three to four hours, Von Bruns and Peraire report cases in which gangrene followed the use of a 1 per cent solution for 24 hours, and Levai cites cases in which a 2 per cent solution applied for 12 hours produced gangrene.

Kortum regards the cause as neuropathic. Frankenberg states that "the epidermis is destroyed, the submucous tissue shows considerable transudation, and the contents of the lymph- and blood-vessels are coagulated. Gangrene follows the thrombosis of the vessels."

Levai and Honsell made a series of experiments and arrived at the conclusion that "it is very probable that the



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Carbol acid granulations on the Extensor surface of the hand

action of carbolic acid is not a specific one but is analogous to that produced by mineral acids

Von Bergmann states Individual disposition probably plays a certain part as I remember in my experience during the period when carbolic acid was still used in the treatment of wounds and a difference in toleration was noticed

The author is inclined to consider that in the use of weak solutions of carbolic acid there is not a primary destruction of the epidermis as Frankenberger states but that the primary changes are of a neuropathic character this is followed by a slowing of the blood current in the part affected with transudation of the elements of the blood and that following the blocking of the blood and lymphatic system coagulation takes place as a specific result of the action of the carbolic acid which necessarily becomes stronger in character as the watery elements of the solution disappear through evaporation

In the treatment of this condition one should not hastily advise amputation Very often only a superficial necrosis of the part is produced and by conservative treatment the part may be saved and the necrosed area covered by skin grafting When the part has become dry and bluish black in color and it is evident that complete gangrene has taken place in the part then and only then should amputation or exarticulation be performed above the line of demarcation

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, November 11, 1908

The President, DR JOSEPH A BLAKE, in the Chair

ACUTE HEMORRHAGIC PANCREATITIS

DR JOHN F ERDMANN presented a woman, 22 years old, who, when she was first seen by Dr Erdmann, on August 13, 1907, gave the following history On June 13 she had a pain in her abdomen, and for some time previous to that date she had suffered from "spoiled stomach" The pain in the abdomen was typical of gall-stones, the pain continuing for a few days, and was accompanied by vomiting Between June 13 and August 13, 1907, she had a number of similar attacks, and in one of them she became markedly jaundiced On the 12th of August she had a sharp abdominal pain, intense and back-splitting, which immense doses of morphine failed to relieve

When the patient was brought to the sanitarium, she presented more or less evidence of shock, with rise of temperature and rapid pulse, and intense pain in the epigastric region, this extended laterally into the back and also to the area of the gall-bladder A probable diagnosis of acute hemorrhagic pancreatitis was made A suggestion to open the abdomen that night was refused, but the following morning the conditions were so much worse that the members of the family themselves saw the change, and consented to an operation

Upon opening the abdomen there was a free gush of beef-broth-like fluid, and some evidences of fat necrosis The pancreas was rapidly exposed and found to be profoundly hemorrhagic The oedematous infiltrate extended retroperitoneally toward the hepatic flexure and the ascending colon Palpation

of the gall bladder showed that it was filled with numerous small stones 70 in all being removed by cholecystotomy. The peritoneum over the pancreas was punctured in several places and a cigarette drain was inserted to its site. The patient reacted well from the operation and for several days there was free drainage of a musty mucilaginous material. The edges of the wound showed fat necrosis in the panniculus adiposus. The patient was placed in a semi sitting posture in about two days and left the hospital at the end of the fourth week the wound then being practically closed. Now at the end of fifteen months the patient is entirely well with the exception of slight digestive disturbances. She had gained in weight.

Examination of the urine at the time of the operation proved negative as to sugar. No Cammidge test was made on account of the emergency.

GASTRO ENTEROSTOMY (ROUX) FOR CONTINUED VOMITING

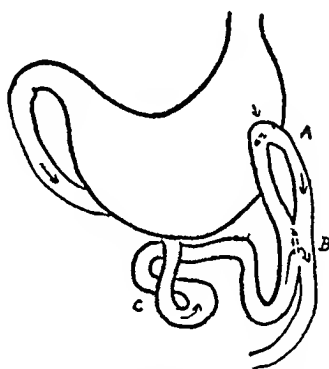
DR CHARLES A. ELSBERG presented a woman 23 years old who was first operated on in Berlin three years ago by Prof Israel for acute appendicitis. About a year later on account of symptoms of gastric ulcer with vomiting of blood she was operated upon by Krause of Berlin who did a gastro enterostomy. After this operation she developed signs of vicious circle she was again operated upon and an anastomosis was made between the ascending and descending loops of the jejunum. After this last operation the vomiting ceased.

The patient was admitted to the medical service of the Mt Sinai Hospital in July 1908 with the history of having suffered from vomiting and diarrhoea for the past three weeks. She was put upon rectal alimentation and careful treatment but in spite of all that could be done the vomiting persisted and she emaciated rapidly. A number of times during the day and night she would expel from the stomach large quantities of green fluid sometimes streaked with blood.

Dr Elsberg was asked to see the patient in consultation with Dr Libman and agreed with him that an exploratory operation was urgently indicated. On July 31 he opened the abdomen through an incision to the left of the old scar and found the stomach and intestines bound together by abundant adhesions.

It was almost impossible to trace the course of the intestines until a large number of adhesions had been divided. Finally, he was able to follow the course of the duodenum and jejunum, and to understand, as he thought, the condition of affairs. From the duodenojejunal junction the bowel passed downwards, then upwards and to the right, underneath the first portion of the jejunum, then back again to the left side and then upwards to the anterior wall of the stomach, where the anastomosis had been made. There was also a broad anastomosis between the afferent and efferent loops of jejunum. Two fingers could be passed with ease through both of the stomata. The only point of note was that the anastomosis between the stomach and jeju-

FIG 1



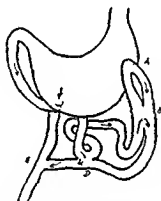
Condition found at first operation. A, gastro enterostomy, B entero anastomosis
C, twist in jejunum

num had been made very high up on the fundus. The jejunum that formed a loop underneath the first part of the jejunum was compressed and could not be freed. Evidently, an anterior gastro-enterostomy with a large loop had been made, and this loop had become twisted upon itself in the manner described. The pylorus felt normal. Believing that the trouble lay in the twisted loop of jejunum, Dr. Elsberg made an anastomosis between the jejunum beyond the old gastro-enterostomy and the twisted loop of jejunum (see Fig 2).

In spite of this operation, the vomiting continued, enormous quantities of bile being expelled from the stomach at frequent intervals. The patient was carefully examined for evidences of some other disease to which the vomiting might be secondary,

and the possibility of a neurosis or hysteria was considered but nothing could be found. Inasmuch as all parts of the jejunum were now well drained (see Fig 2) the only possibility was that on account of the position of the anastomosis there was a valve formation at the stoma high up near the cardia. The patient's condition became progressively worse and another operation was decided upon. The abdomen was again opened through the old scar and as the various anastomoses were found patent Dr. Elsberg said he determined to do an entirely new gastro-enterostomy and chose the method of Roux. A very large mass of adhesions had to be divided before the transverse mesocolon near the pyloric end of the stomach could be exposed.

F



After second periton. D. entero-an. t. m. made t. first per. t. E. E. g. tro-
entero-tomy en Y m. d. t. cond. per. t.

An opening was made into it the jejunum divided (see Fig 2) and an anastomosis was made between the jejunum and the posterior surface of the stomach near the pylorus by suture. Before this was done an end to side anastomosis was made between the proximal jejunum and the peripheral jejunum by means of a Murphy button. One part of the button was pushed down into the peripheral jejunum in the manner described some years ago by Dr. Robert F. Weir.

The patient stood the prolonged operation well and for two days the vomiting was slight. Then in spite of all treatment she began to vomit again and this continued for ten days no matter whether food was taken into the stomach or not. At this time the button was passed and within 24 hours

the vomiting ceased. The patient began to take food regularly, and she rapidly gained flesh and strength. The wound healed by primary union, excepting for a small drainage opening. Since the last operation she had gained about 30 pounds in weight, she felt perfectly well and had resumed her work as a nurse.

RESECTION OF INTESTINE PRESENTING UNUSUAL FEATURES

DR. ELSBERG presented a boy, fourteen years old, who had been operated on in August, 1907, for acute appendicitis, with abscess and diffuse peritonitis. In January, 1908, he was re-admitted into Mt. Sinai Hospital with symptoms of acute intestinal obstruction of 36 hours' duration. At the operation, which was done at once, a loop of ileum was found gangrenous and constricted by a broad band. In spite of the presence of fecal vomiting, the patient's condition was so good that a radical resection was determined upon. Twelve inches of the ileum were removed and an end-to-end anastomosis made by suture. After twenty-four hours the fecal vomiting ceased, and thereafter the boy made a steady recovery for ten days. At that time, when only a sinus remained, he suddenly developed symptoms of acute obstruction, and within a few hours his general condition was very serious. Just prior to his removal to the operating room it was noted that there was a slight feculent discharge from the sinus.

The abdomen was again opened through the first scar, and a large loop of intestine, including the former anastomosis, was found constricted by a band, and its vessels thrombosed. Through the distention of the affected loop, the anastomosis had given way at one point. This time about three feet of intestine were removed, the peripheral end being near the ileocecal junction. The patient's condition was so poor that all operative manipulations had to be rapidly done. The bowel was removed in the usual manner, the ileocecal end closed by a double layer of sutures, a tube tied in the ileum, and the end of the bowel fixed in the wound, thus forming an iliac anus. Although the patient was in extremely poor condition at the end of the operation, he recovered after energetic stimulation. After a few days the tube came away, and it was impossible to control the discharge.

of feces from the bowel. The patient was continually bathed in feces and was in a deplorable condition.

Ten days later Dr. Elsberg opened the abdomen a third time this time by an incision to the left of the median line as far away as possible from the artificial anus. After some difficulty the ileum which led down to the anus was found and at a point about two feet from the artificial anus an ileocolostomy by lateral anastomosis was done by suture. By this means he hoped to divert the feces into the colon but in spite of the fact that a large opening had been made and that the stoma was patent (as was proven by the injection of fluid into the rectum and its appearance at the artificial anus) most of the feces still came out of the artificial anus. Every possible means to control this by means of distended rubber bags in the bowel by pressure by keeping the boy in the Trendelenburg posture etc. were tried but without success. He was continually bathed in feces his skin was raw and very tender and he was rapidly emaciating.

At the fourth and last operation the speaker said he planned to close the bowel peripherally to the ileocolostomy and then extirpate the intestine down to the artificial anus. On account of the many adhesions this could not be done so he united the ileum beyond the ileocolostomy again to the descending colon by lateral anastomosis by suture closed the gut just beyond the stoma and extirpated the entire bowel distal to this point. The removal of the bowel about eighteen inches long was rendered very difficult through many old adhesions. It was accomplished by the following method. The mesentery was first tied and cut off the end of the bowel grasped by a clamp inverted into itself and made to emerge through the artificial anus on the right side. It was excised from there as soon as the left abdominal incision had been closed. The patient made a good recovery from this operation he rapidly gained flesh and strength and was discharged cured one month after the operation.

EXCISION OF THE GREATER PART OF THE COLON

DR. JOHN F. ERDMANN presented a man 33 years old who gave a history of having suffered for about two years with attacks of indigestion and cramp like pains and that he had lost from 35 to 40 pounds in weight. When Dr. Erdmann first

saw him, on November 16, 1907, he gave no record of having lost flesh, and only a brief history of spasmodic pains in the abdomen, simulating a gall-bladder or mild appendix attack. His temperature at this time was 100° , pulse about 80, and there was no point pressure anywhere in the abdomen excepting over the appendix. There was no history of any associated trouble in the abdominal cavity, which pointed to the conditions found at the subsequent operation. He had been under the care of some of the best internists, and a diagnosis of gall-bladder and appendix invasion had frequently been made.

Operation—Through a Kammerer incision the appendix was exposed and removed. It was seven inches long, about half an inch in diameter, its lumen was widely distended and its coats were thin, and it was adherent in the pelvis. No evidence of intestinal obstruction or disturbance was found at this time. The patient was relieved from all abdominal symptoms for a period of three days, and stated that he felt better than he had for months. Movements of the bowels were obtained until the fifth day, when he began to be restless and showed marked evidences of abdominal cramps, the centre of the disturbance being near the splenic region. It was evident at this time that some gross lesion, obstructive in nature, was present, and it was suspected of being in the large intestine. The patient was observed for another twelve hours. He then began to vomit fecal material, and was immediately submitted to operation for intestinal obstruction. The stomach was washed out and then the abdomen was rapidly opened. The site of the obstruction was found to be at the splenic flexure, and consisted of an annular growth about an inch in length, and completely surrounding the colon. Owing to the distention of the small intestine, an enterotomy was done, the intestines were stripped and washed with salt solution. The opening was then sutured and the sigmoid attached to the cæcum by means of a Murphy button. After the completion of the sigmoidocæcostomy the patient's condition was such that it was deemed inadvisable to remove the growth, and this was deferred to a later day. The patient was put to bed in a condition of collapse. The button was passed on the eighth day, and the patient left the institution in the third week, refusing to have the excision of the growth done until he had recuperated by going away for a short time.

He finally consented to have the tumor removed on February 29 1908 a little over three months after the second operation. At this time the growth was exposed without difficulty it had increased to almost twice its former size and a few glands were evident in the mesocolon. The colon owing to the invasion of the glands was excised from the ascending to the beginning of the descending colon the free ends being simply turned in and left as blind pouches. The patient made a speedy recovery and had since gained thirty pounds in weight. He had previously gained twenty pounds between the second and third operations. Up to the present time there were no evidences of a recurrence. Pathologically the growth was reported as being a colloid carcinoma.

PROSTATECTOMY

DR JOHN F EROMANN presented a man 41 years old who was referred to Dr Erdmann by Dr John F Moore in April 1908. There was no history of gonorrhoea syphilis or any genito urinary trouble. Three years before or at the age of 38 he had suffered with difficulty in voiding urine having to get up three or four times during the night and voiding small amounts every fifteen to sixty minutes during the day. There had been slight evidence of blood in the urine for the past year. An analysis of the urine showed some albumin and considerable pus and decomposed material.

Examination showed a bladder distended almost to the umbilicus. The patient complained of considerable pain with inability to void urine and suffering from a dribble overflow. The catheter withdrew sixty ounces of urine. He stated that he had been catheterized once in forty eight hours for the past two weeks drawing off a large quantity of urine each time. A No 20 F catheter passed easily and no evidences of prostatic enlargement were made out.

When the patient returned for examination the following day he was again catheterized withdrawing thirty five ounces of urine. Attempts at cystoscopy failed due to ultra sensitiveness and cloudy urine. He was then admitted to the Private Hospital Association and for a week was kept under observation with careful catheterization irrigation etc and at the end of that time it was decided to do an exploratory operation in case

cystoscopy under anæsthesia revealed the causes of the obstruction. Upon one occasion, 100 ounces of urine were withdrawn at a single catheterization.

On April 18, 1908, an attempt at cystoscopy failed on account of the current being out of order. It was deemed advisable, as the patient had given his consent, to do a cystotomy and make a direct examination. This revealed a small nodule, ball-valve in character, about the size of a marrow-fat pea, springing from the upper margin of the inner meatus. The prostate, by internal palpation, was of about normal size. Further examination of the bladder showed the ureteral orifices sufficiently dilated to admit the tip of the little finger. The prostate, together with the so-called enlargement, which acted as a ball-valve, was removed. The patient, who had previously been in a very poor state of health, reacted promptly from the operation, and since then his weight had increased from 128 to 159 pounds, his usual weight being about 170 pounds. From the time of the operation up to the present time he has been able to void his urine spontaneously, with a varying amount of residual, between two and six ounces. He was now able to pass a stream with perfect ease. The urine at present was clear, and presented absolutely no evidence of decomposition. No tubercle bacilli nor coli commune were found in the urine during his stay in the sanitarium. Since then he had been seen about once a month, the catheter introduced and the residual withdrawn, no effort being made at irrigation. No cystoscopic examination had been made, the residual urine being attributed in all probability to atony. At the present time, dilatation of the urethra and internal meatus was being done once a week.

HYDRONEPHROSIS FROM ABNORMAL URETERAL IMPLANTATION

DR JOHN P ERDMANN presented a man, 28 years old, who was admitted to the hospital on July 1, 1908. The history he gave was that he had been irregular in his habits as regards eating and sleeping, and that he had used alcoholics moderately. He had no recollection of having had any of the diseases of childhood, nor any venereal disease. His first illness, about three years ago, began with dull pain in the left lumbar region, this

would last for two or three days and then disappear for several months only to recur. Recently the intervals between these attacks of pain had been shorter.

His present illness began about ten days ago with pain in the left lumbar region which became so severe and sharp that he could not sleep nor lie still in bed nor could he walk about. This pain had persisted for several days.

Upon examination the abdomen was not quite symmetrical. There was moderate bulging of the left side between the crest of the ilium and the first rib. There was tenderness, moderate rigidity and flatness over this tumor which seemed to be over the left kidney or the kidney pelvis site. There was dulness, swelling and tenderness over the left lumbar region extending around to the spine. The patient complained of constant and great pain over this tumor. The extremities were normal. An X-ray taken by Dr. Caldwell was negative of kidney calculus. The urine was also negative.

Operation July 3 1908—An incision 1½ inches long was made parallel with the crest of the ilium and two inches above it beginning at the tip of the twelfth rib posteriorly. The kidney was easily exposed and brought into the wound. The following conditions were found: (1) A small hydronephrotic sac at the lower pole of the kidney. (2) A very small narrow ureter issuing from the lower part of this sac and kinked upon itself when the kidney was in its abnormally usual position of nephaptom. (3) The kidney was much smaller than usual and was prolapsed.

An incision into the ureter showed that its lumen was patent but very narrow. A grooved director passed through the cortex revealed no stones. The kidney was packed up higher in the lumbar region by means of gauze about the lower pole to replace it normally thus relieving the ureteral kink. The small incision into the ureter was left unsutured, a gauze drain being passed down to the ureteric incision and brought out to the lumbar wound. All dead spaces were packed with gauze and the wound sutured in tiers with No. 2 chromic gut leaving a space about the middle for exit of the drain ends. Dry dressing.

The patient's postoperative course was normal. There was very little leakage, the wound closed and the patient left the

hospital in three weeks Since then he had had no further attacks of pain

DR WILLY MEYER said that during the past summer he had to operate on a case of intermittent hydronephrosis where there was a very large sac, and where the ureter was turned on itself so that it came in contact with the sac The case was treated by doing a plastic operation by the Finney method, and the patient made a perfect recovery

SYMMETRICAL ADENOLIPOMA OF THE NECK

DR ELSBERG, for Dr Howard Lihenthal, presented a man, 45 years old, with an extensive development of adenolipomata on both sides of the neck and extending down on the chest The interesting feature of the case was the symmetrical character of the growths Some of these tumors had been excised and examined, and had been found to contain only fatty tissue A similar case had been shown at a meeting of the Society some years ago by Dr Erdmann

Dr Elsberg said that at least fifty per cent of these cases, according to Charcot and Marie, succumbed to pulmonary tuberculosis within five years after the inception of the disease This patient thus far showed no pulmonary symptoms

SPLENECTOMY FOR SPLENIC ANÆMIA (RESECTION OF COSTAL ARCH)

DR WILLY MEYER presented a man, 41 years old, who entered the German Hospital on October 27, 1907, with all the symptoms of a chronic severe disease of the blood After careful examination the case was regarded as one of pernicious anæmia At the time of the patient's admission, he was lemon-colored The heart and lungs were normal There was marked enlargement of the spleen, the liver was slightly enlarged, and there was some glandular enlargement An examination of the blood showed 1,260,000 red blood corpuscles, 4800 whites, and 40 per cent of hæmoglobin His condition was so poor at this time that the house surgeon, Dr Ottenberg, made a transfusion from man to man by the method devised by himself, a description of which appeared in the ANNALS OF SURGERY (1908, xlvii, 486) The possibility of the case being one of Banti's disease was also considered at this time Under various methods of treatment, the

blood condition slightly improved. He left the hospital in February 1908 but returned again on March 13 1908 complaining of such intense abdominal cramps in the region of the enlarged spleen that he demanded operative relief if possible. The direct transfusion had not been of much benefit inasmuch as he had the same percentage of hæmoglobin and number of whites as formerly the red blood corpuscles were 2 072 000. After further study of the case by D F Kaufmann of the German Hospital it was thought that removal of the spleen might effect a cure. This operation was done on March 23. The spleen was exposed through a median incision it was much enlarged and upon introducing the hand into the vault of the diaphragm a few adhesions were found anteriorly and a broad band posteriorly adherent to the diaphragmatic and third dome posterior abdominal wall. A transverse incision at right angles to the first just above the umbilicus and meeting the tip of the tenth rib was added and in order to gain more room it was lengthened still further toward the tip of the eleventh rib parallel with the costal arch. The incision downwards was then lengthened with excision of the umbilicus and osteoplastic resection of the costal arch done. For the latter purpose the linea alba was incised to the left laterally and the sheath of the rectus opened. The muscle was then loosened from the posterior sheath and peritoneum and the arch exposed. The superior epigastric artery and vein sending many branches to the muscle required numerous ligations between which the branches were divided. The seventh eighth ninth and tenth costal cartilages were then divided with the knife immediately in front of the ribs also the union of three at the sternum and the resection of the costal arch completed without the infliction of any injury to the surrounding structures.

The skin flap was now turned back and the arch raised by an assistant. This gave decidedly more room and the spleen could now be freely luxated. It measured about 15 x 6 x 4 inches and there was a firm broad band binding it down to the parietal peritoneum at the diaphragm and the descending colon. These were divided between ligatures under guidance of the eyes. The pedicle of the spleen was firmly adherent to the tail of the pancreas and because of hemorrhage a clamp was placed around the latter it was then firmly compressed and a chromicised cat

gut ligature put in place, a second clamp having been placed nearer the spleen temporarily. The parts were then divided and the spleen thus removed with a portion of the pancreas. Then the wound closed. The patient made an uneventful recovery from the operation, and since then his general condition had steadily improved. Whereas before the operation the red blood-cells numbered 2,072,000, they now numbered 4,300,000, the white 13,000 and the hæmaglobin has increased from 40 to 90 per cent.

Dr Meyer said he had resorted to osteoplastic resection of the costal arch in four cases, three of them being operations on the spleen and one on the stomach. It should only be done in those cases where its line of descent interferes with the proper exposure of the parts.

IMPERMEABLE CICATRICIAL STRICTURE OF THE ŒSOPHAGUS, FEEDING THROUGH GASTRIC FISTULA FOR TWELVE YEARS

DR MEYER presented a boy, eighteen years old, who in February, 1896, swallowed, by mistake, a large quantity of caustic lye, resulting in an œsophageal stricture. The case was originally presented by Dr Meyer before the New York Surgical Society on January 7, 1904, and was subsequently reported in full in *The Medical News*, October 29, 1904. Ten days after swallowing the lye he was admitted to one of the city hospitals, where gastrotomy and division of the stricture by Abbé's string method, at the same sitting, were done one month later. Under suitable after-treatment, the boy was soon able to take food again by way of the mouth. In spite of all that was done, however, the œsophagus showed great tendency to re-contraction. After a few months the stricture had re-formed, and a gastric fistula, according to Witzel's method had to be established. All attempts at passing the stricture of the œsophagus from above or below were unsuccessful, and the boy had to be fed entirely through the gastric fistula. Seven years later (September, 1903), when the patient was brought to the German Hospital, the entrance into the stricture was so tight that it was impossible to pass even a filiform bougie into the stomach by way of an œsophageal fistula at the neck, which had been made for the purpose. On

December 1 1903 an osteoplastic gastrotomy was done by Dr Meyer in order to gain a passage through the œsophagus from below raising the costal arch but this also failed

At the present time twelve years after the original injury the boy was still being fed through his gastric fistula and Dr Meyer thought it would be futile to make any further attempts to re establish the patency of the œsophagus which was evidently the seat of a very extensive cicatricial obliteration The patient was fairly well nourished He had gained 26 pounds within the last two years and now weighed 106 pounds The method by which he was fed was as follows He was instructed to partake of a mixed ordinary table diet and in order to get the benefit of the admixture of the saliva which was doubtless an important factor in digestion and nutrition and at the same time to enjoy the taste of his food he masticated his food thoroughly and then removed it from his mouth into a cup and introduced it into the stomach with the help of a large syringe through the gastric fistula The boy was a very hearty eater and had at present a tremendously enlarged stomach Recently he had been seized by epileptiform attacks and he had been instructed to wash out his stomach regularly and take six or eight small meals during the day instead of three large ones with a resulting improved condition This was one of the very rare cases that had been successfully nourished through a gastric fistula for many years

PERICARDIOTOMY FOR TUBERCULOUS EFFUSION

DR MEYER presented a man 33 years old who had been an inmate of the German Hospital for some time His left pleural cavity had been repeatedly tapped and large quantities of a straw colored fluid had been evacuated No tubercle bacilli had been found in this fluid However the Calmette test was positive The man's general condition was poor Examination showed the presence of fluid in the pericardium.

On March 10 1908 at the request of Dr Kaufmann a large needle was introduced by the speaker into the pericardium in the sixth intercostal space close to the sternum it was pushed upward and outward and immediately gave exit to a large quantity of black fluid about 1250 c.c being withdrawn The man was much improved after this operation but eight days

later he again showed symptoms pointing to a recurrence of the pericardial effusion. On March 17 the needle was again introduced, evacuating about 1000 c c of the same black fluid. There was but slight improvement after this second operation, and again the fluid rapidly re-accumulated.

On March 23, 1908, under local anæsthesia, an incision was made from the middle of the sternum over the course of the sixth rib. The cartilage was divided with Gigh's saw near the rib, then elevated and cut through with the scissors at the sternum and the remains removed with the rongeur forceps. On dividing the tissues parallel with the sternum, the internal mammary artery was exposed and ligated. The pleura was punctured, and a large amount of straw-colored serous fluid escaped. In order to gain more room, an excision of the seventh cartilage was necessary. The rent in the pleura was covered with a pad of gauze, and the pericardium exposed. It was aspirated, giving exit to the same black fluid that had been found at the former paracentesis. The pericardial membrane was then freely incised, evacuating at least three quarts of fluid. The finger was introduced into the large pericardial cavity, but the heart could not be felt. On pushing the finger upward, a mass of coagulated fibrin was felt, which, when cleared away, allowed the heart beats to be felt. The rest of the fluid was then thoroughly evacuated, and by prolonged use of sponges on handles all the fibrin of grayish-black color was removed. A large-sized drainage tube was then introduced, and the pericardium irrigated with warm saline solution. By holding apart the edges of the incision in the pericardium, which was enlarged by a short transverse incision inwards, the cavity of the pericardium could now be beautifully illuminated with the electric light, and the comparatively small pulsating heart was clearly seen, high up, hanging on its vessels. By this time the patient's condition had materially improved. Two long drainage tubes were introduced into the pericardium, and the skin incision was closed with a few silk-worm gut stitches. The patient was put to bed in excellent condition, the upper end of the bed being raised. He made a rather slow, but perfect recovery. His condition at the present time is excellent.

ACCIDENTS IN HERNIA OPERATIONS WITH ESPECIAL
REFERENCE TO THE VESSELS

DR JOHN F ERDMANN read a paper with the above title for which see page 208

DR WILLIAM B COLEY said that from personal communications he knew of four instances of injuries to the arteries or veins from needle puncture during the insertion of the deep sutures in Poupart's ligament. The results in these cases were of interest. In one case the operation was done for strangulated hernia. The iliac vein was badly injured during operation and the leg had to be amputated. In the second case the vein was opened, it was closed by lateral suture with uneventful recovery. In the third case the right iliac vein was injured during operation for inguinal hernia in a girl of 18. In this case the needle was introduced from above downwards and the surgeon stated that it required an extensive dissection in this region before the opening of the vein could be caught with forceps and a lateral ligature applied. The remaining steps of Bassini's operation were then completed and a satisfactory recovery followed.

In the fourth case the patient 64 years old had been operated on for strangulated inguinal hernia on one side and after that operation was completed a further operation for a large irreducible hernia on the other side was performed. The notes of the surgeon who did the operation stated that when passing the needle through the under surface of Poupart's ligament he removed his finger from the tissues about the iliac artery too quickly, caught it with the needle and when tied the thread cut through the atheromatous artery. When he removed the stitch a deluge of blood followed, showing that the external iliac artery had been wounded. It was compressed with the fingers until it could be secured by a clamp and a ligature above and below was then applied. The patient made a tedious recovery with slight sloughing of the calf and heel.

Dr Coley said he believed that this accident could be always avoided if the following precautions were observed. The first and most important of these he thought was to see that the needle was always inserted in Poupart's ligament from below upward instead of from above downward (i. e. it should be first introduced into the internal oblique muscle and then into Pou

part's ligament, instead of vice versa) (2) The ligament should always be pulled slightly upwards and inwards by thumb forceps during the introduction of the sutures (3) If the needle be held with the fingers instead of a rigid needle-holder, the danger of injuring the vessels will be still further lessened

Dr Coley said he had personally operated upon upwards of 2,200 cases of inguinal and femoral hernia, 1,000 adults and 1,200 children, without ever having met with an accident of any kind At the Hospital for Ruptured and Crippled, 2,340 operations had been performed by Drs William T Bull, John B Walker and himself, without accident, due largely, he thought, to the observation of the precautions stated

As regarded injury in bladder hernia, in practically every hernia of the bladder that he had seen there had been present a large amount of peritonoeal fat In the presence of this fatty tissue outside of the sac he was always suspicious of a bladder hernia, and took the usual precautions Thus far he had never injured the bladder

DR ERDMANN said that when he had described his method of inserting the needle as from above downwards, he meant from the proximal to the distal position of the body as it lies on the operating table

DR WALKER said that in operating for femoral hernia he had never seen the bladder He could recall only one case where a vessel was injured during a herniotomy, and in that instance the needle was passed downward through the Poupart's ligament and then upward through the internal oblique The tip of the needle perforated too deeply through the ligament, tearing into the epigastric artery Troublesome hemorrhage followed A clamp was applied to the site of the vessel and removed at the end of forty-eight hours A normal recovery followed

DR BLAKE said the expressions, "passing the needle from above downwards" or from "below upwards," were somewhat ambiguous, unless it was understood that they were to be taken in an anatomical sense, and not in relation to the position of the patient

OPERATION FOR PULMONARY EMBOLISM

DR WILLY MEYER described the operation proposed by Prof Trendelenburg, of Leipsic, before the last German Surgical Congress, for embolism of the pulmonary artery He ex-

bited the instruments that were used and presented to him by Prof Trendelenburg to facilitate the operation which was a delicate one requiring a resection of the three ribs with their cartilages and the opening of the pleura and pericardium. The operative work naturally involved great skill and dexterity. Dr Meyer said that one could not but feel great admiration for Trendelenburg who at an advanced age had the energy and courage to initiate and carry on the experiments for the relief of this condition in animals and test it afterwards in the human being. Although his patients operated on had not definitely recovered the feasibility of the operation had been clearly demonstrated. With proper training of nurses and assistants to promptly recognize the trouble the hope might be entertained that a number of these otherwise hopelessly lost patients might be saved in the future.

Stated Meeting November 25 1908

The Vice president DR ELLSWORTH ELIOT Jr in the Chair

GENERAL TUBERCULAR PERITONITIS

DR IRVING S HAYNES presented a girl of eight years who was admitted to the Harlem Hospital on January 14 1908. According to her family history one maternal aunt and uncle died of tuberculosis. The patient had measles two years ago and had suffered from bronchitis and cough for several years.

Present History.—About December 15 1907 the mother noticed that the child's abdomen was beginning to grow larger. This had continued up to the present time. There had been no pain. The urine had been diminished in quantity. She had had fever and night sweats.

Upon examination the abdomen was found to be generally enlarged. It was flat on percussion excepting over an area above the umbilicus which was tympanitic. This tympanitic area changed with a change of position and the presence of free fluid in the abdominal cavity was shown by percussion and ascitic waves. The urine was normal. Temperature 103 pulse 132.

An examination of the blood showed 8,500 white cells and 2,240,000 red cells

The case was diagnosed as one of tubercular peritonitis, and was operated on by Dr Haynes on January 16, 1908. An inter-muscular incision, two inches long, was made over the appendix Free, blood-tinged fluid was found in the peritoneal cavity. The peritoneum, intestines and omentum were thickened, and of a deep red color. The superficial blood-vessels were prominent, and the surfaces were studded with tubercles. The mesenteric glands were enlarged. The appendix was removed, its stump cauterized and inverted into the cæcum by a purse-string suture. A saline irrigation was then given for its possible curative effect on the tubercular process. The abdomen was closed by layer sutures.

Following the operation, the child's temperature gradually fell from 103 to 99, and the pulse from 130 to 90. The wound healed by primary union, and the patient's health steadily improved. Internally, she was given cod-liver oil and guaiacol carbonate. She left the hospital on February 2, 1908. About a month later the abdominal wound opened throughout its entire extent, discharging a bloody serum, with small cheesy masses. The wound was treated with injections of balsam of Peru, argyrol, and aristol. The child was kept out of doors, with careful attention to her general nutrition, and the guaiacol carbonate was continued for several months. The abdominal sinus gradually closed, and finally healed about October 1. The patient had increased in weight and was apparently in good health at the present time.

DR HOWARD LILIENTHAL said he had seen quite a number of cases of tuberculous peritonitis in individuals varying in age from very early childhood to late adult life, and most of the cases he had operated on had recovered. He believed that operation unquestionably had a great deal to do with the favorable outcome, in spite of the fact that that question was still under discussion. He had noticed that the most favorable cases for operation were those where the abdomen contained a large amount of fluid, while the dry form was less favorable for surgical intervention, although they may be proper cases for operation on account of the obstructive symptoms.

During the past four years, Dr Lilienthal said, he had been

using the old tuberculin as a supplement to the surgical treatment beginning with one forty thousandth of a milligram and not running the dose high enough to cause a reaction. He was convinced that this was of real value and that it should be used more frequently. In the case shown by Dr. Haynes there was a decided irregularity of the abdominal outline in one area suggestive of the presence of adhesions and a probable recurrence of intestinal obstruction in the near future.

DR. ALEXANDER B. JOHNSON said that his experience in common with that of others was that those cases of tubercular peritonitis associated with a considerable accumulation of serum in the abdomen were the only ones that were usually notably benefited by surgical intervention and even those had not always done well. In that group of cases attended by localized accumulations of broken down tubercular material and infiltration of the intestinal coils with tubercles the results had not in his hands been satisfactory. In those cases where the process was a dry one and one found simply an obliteration of the peritoneal cavity his results had not been very favorable. While those patients had not been injured by operation they had not been benefited.

Dr. Johnson said that about ten days ago an elderly woman was brought to the hospital with symptoms of obstipation. The bowels had been extremely difficult to move and upon examination he found what he considered to be a number of distended coils of large intestine. After repeated enemata he could still feel a large sausage shaped tumor along the course of the descending colon. Upon opening the abdomen in the left iliac region he found a tubercular peritonitis with complete obliteration of the peritoneal cavity. The tumor that had been felt proved to be a mass of tubercular omentum.

DR. JOHN ROGERS called attention to the fact that a fecal fistula occasionally followed operative interference with these cases particularly those of the adhesive type. If that accident occurred there was no escape from a fatal outcome.

DR. JOHN B. WALKER mentioned the case of a girl of sixteen years who was operated on for a tubercular peritonitis which apparently originated in the appendix. A fecal fistula followed and the case resulted fatally in about six months.

DR. LILIENTHAL thought the statement made by Dr. Rogers was rather too sweeping unless he limited it to true fecal fistula.

(of the small intestine) Personally, he could recall two cases of fecal fistula of the colon following operation for tuberculous peritonitis, and in both instances the patients recovered

DR ROGERS mentioned two cases in which a fecal fistula resulted, in spite of the great care that was taken not to tear or manipulate the gut. The abdomen was simply opened and flushed out.

DR JOHNSON said that about two months ago an Italian girl, about 16 years old, was brought to the hospital complaining of swelling of the abdomen, pain, tenderness and fever. There was marked increase in the leucocyte count, with a relatively high increase of the polymorphonuclears. No positive diagnosis was made prior to operation. Upon opening the abdomen he found an ovarian cyst of considerable size, containing perhaps a quart of fluid, which proved to be tuberculous. There was also a very large abscess outside of the ovarian cyst, the contents of which had a very strong fecal odor. The coils of small intestine, as far up as the umbilicus, were the seat of a peritonitis. In separating the various adhesions and emptying the cyst, he came upon a large lumbricoid worm, but it was impossible to locate the perforation in the small intestine from which the worm had escaped. After the operation practically all the contents of the small intestine escaped through the wound, but by careful attention to the after-treatment, regulating the diet, keeping the wound packed and strapped, the patient finally recovered. The tract leading to the fistulous opening was deep and this he believed rendered the chances of spontaneous closure better.

DR ARTHUR L. FISK said that about fifteen years ago he was asked to operate upon a young man of 25 years, who had typical signs of appendicitis, with a mass in the right iliac fossa. The usual incision was made over the site of the appendix, and when the peritoneum was opened, the caput coli was seen thickly studded with tubercles, and the wall of the bowel was greatly infiltrated. The abdominal incision was closed without any drain, no operation was performed on the bowel. Within three weeks after, a fecal fistula developed in the site of the abdominal incision, the patient died within two months thereafter.

Dr Fisk recalled four other cases of tubercular peritonitis, which he had operated upon, in three of these the peritoneum was covered with tubercles and there was fluid within the peritoneal

cavity these cases were all benefited by the operation but the fourth case was of the dry adhesive variety and this case was neither helped nor injured by the operation.

DR WALKER mentioned the case of a woman about thirty upon whom he operated for tubercular peritonitis evacuating a large amount of fluid Five years later the patient was again operated this time for appendicitis and at this operation no adhesions were found and no evidences of the former peritonitis

DR JOHN A HARTWELL said that in discussing this subject we should bear in mind the different forms of tubercular peritonitis In the case shown by Dr Havnes the inflammatory process was apparently limited almost entirely to the peritoneum without any involvement of the other intra abdominal structures except the possibly primary focus in the appendix The cases where the intestines were intensely matted together belonged to another class and their treatment was entirely different Under those conditions a simple laparotomy was very apt to produce a fecal fistula whether the intestines were handled or not The speaker said he had seen several such cases at the Lincoln Hospital in colored patients and in spite of every precaution a fecal fistula developed in three or four of them with fatal results Those could not be properly classified as simple tubercular peritonitis

Dr Hartwell said that in a case seen at Bellevue Hospital the patient in addition to the tubercular peritonitis had tuberculosis of the ascending colon which was occluded to such an extent by the inflammatory process that it barely permitted the passage of a probe Such cases he did not think could be benefited by operation unless it were possible to remove such foci which in those cases with extensive intestinal involvement it is impossible to do

DR FISK said that the distinction between these different forms which Dr Hartwell made was not the usual one These varieties are progressive stages of the same disease—tubercular peritonitis The early stage is characterized by the formation of tubercles over the peritoneum and fluid within the cavity a later stage by great thickening of the walls of the bowels adhesion (cohesion better) between the peritoneal surfaces of the different coils of the intestines even to obliteration of the peritoneal cavity and possibly finally the formation of abscesses

DR ELLSWORTH ELIOT JR. said that he had seen two cases of

tubercular peritonitis with the subsequent formation of fecal fistula, one of the large and one of the small intestine. The first patient was a girl of twelve years upon whom laparotomy was done for a simple serous tubercular peritonitis. The fluid was removed without damage to the intestines and the wound closed without drainage. The patient left the hospital healed but several weeks later developed an intestinal fistula which discharged for months. Eventually, the fistula closed spontaneously, the child gained in strength and flesh and five years after the operation was still in perfect health without sign of relapse.

The other case was one of advanced tubercular peritonitis of pelvic origin with evidences of beginning cheesy degeneration. Laparotomy and drainage of an extensive pyosalpinx was resorted to. The bladder and rectum subsequently became involved in the tuberculous process and about two months later, the laparotomy wound being still open, the patient developed a spontaneous fistula of both of those organs communicating with each other and with the drainage sinus. The patient succumbed about six weeks later to general miliary tuberculosis. In a third case of tubercular peritonitis of the connective-tissue type in a man 22 years of age, laparotomy was done, but accomplished nothing save the separation of adhesions. Subsequently, his abdominal wound healed, his constitutional symptoms disappeared, and he remained in perfect health and able to work for six months. He then developed a tubercular meningitis which proved fatal.

DR JOHNSON said he wished to record another case of tubercular peritonitis involving the cæcum and ascending colon in which he operated with the idea that he had to deal with an appendicitis. Upon opening the abdomen, he found the cæcum converted into a thick-walled tube, infiltrated with tubercle. The patient was a girl of fourteen years who had been operated on for tubercular glands of the neck by Dr. Johnson, and after the wound in the neck healed she developed symptoms referable to the abdomen. Subsequent to the abdominal operation she developed a fecal fistula, for which she was afterwards operated on at the City Hospital by Dr. H. D. Collins, who resected the cæcum and a portion of the ascending colon and then made an anastomosis. After this the girl remained well for many months, and finally died of tubercular meningitis.

INTESTINAL OBSTRUCTION DUE TO TUBAL PREGNANCY

DR. WALTON MARTIN presented a woman 24 years old who entered St Luke's Hospital on July 17 1908 Three days before admission she had been seized with severe cramp like abdominal pain which persisted and was so severe that on the following day she fainted She gradually grew weaker and when admitted to the hospital she was in a state of collapse Since the onset of her attack there had been no movement of the bowel and vomiting had been incessant During the past twenty four hours the abdomen had become distended

Previous to this illness the patient had enjoyed good health Menstruation had always been regular until three months ago Since that time there had been no regular menstruation but she had noticed on several occasions and at irregular intervals slight bleeding from the vagina

On examination she was seen to be in shock very pale with the skin cold and clammy The pulse was weak and rapid The abdomen was distended and very tense the lower abdomen was tender On vaginal examination the cervix was soft and the os admitted the tip of the finger There was a feeling of fulness in the posterior fornix The patient's temperature was 102 pulse 140 respirations 24 The leucocyte count was 11 300 the differential count showed 91 per cent polynuclear cells the hæmoglobin was 35 per cent

The patient was immediately prepared for operation Under ether anæsthesia the abdomen was opened in the median line and a large quantity of dark colored blood escaped as soon as the peritoneum was incised The left tube was apparently normal in size and appearance at its uterine attachment but near the ampulla a mass the size of an egg could be felt lying above the brim of the pelvis and fixed A loop of small intestine below this mass was flattened while the coils above were distended On freeing the mass and bringing it out through the wound it was seen to be made up of the ampulla of the tube the ovary and a bag of membrane containing a fœtus This hung from the end of the tube and had evidently compressed the loop of bowel for on removal of the mass gas passed into the flattened intestine The wall of the intestine showed no evidence of interference with circulation The tube ovary and fœtus were removed and the abdomen closed At the completion of the operation the patient

was in very bad condition, the pulse being 150 and very feeble. A saline intravenous infusion was given. On the following day there was a gradual improvement. Flatus was passed, and on the second day the bowels moved. From that time on her convalescence was uninterrupted, and she left the hospital on August 9, twenty-one days after the operation.

The uncommon cause of the ileus in this case, Dr. Martin said, seemed to him of sufficient interest to record.

THE PREVENTION OF INTESTINAL OBSTRUCTION FOLLOWING OPERATION FOR APPENDICITIS

DR. FORBES HAWKES read a paper with the above title, for which see page 192.

DR. CHARLES L. GIBSON called attention to the fact that in some instances some antecedent condition of the patient was entirely responsible for any postoperative complication rather than the operation itself. Many of these patients gave a long-standing history of repeated attacks of appendicitis, and the postoperative obstruction might be the result of adhesions and fixation of the intestine at a point remote from the site of the operation.

Another point to which Dr. Gibson referred was that since we had learned to do away with multiple incisions and the insertion of a large amount of gauze drainage, we were less apt to get adhesions than formerly, but in spite of this fact a certain number of the cases did badly. Where a large raw surface was left and free drainage was indicated, he preferred to use a Mikulicz tampon made of heavy rubber dam, such as dentists employed. It should be suitably provided with openings and inserted into the depth of the wound and plugged with gauze. It could be left there almost indefinitely (ten days or more), the gauze only being changed, and did not cause any irritation of the intestines. He looked upon this as the most efficient method where free drainage was indicated.

DR. HAYNES said that about twelve years ago he had a peculiar postoperative experience. After an operation for the removal of pus tubes there was postoperative intestinal obstruction and the abdomen was opened a second time. The small intestines, the cæcum, and ascending colon, were distended with

gas but the rest of the large intestine was collapsed. On drawing the ascending colon downward a kink at the hepatic flexure was straightened out the intestinal contents began to pass through the collapsed intestine and the bowels operated through the natural passage while the patient was on the table. The obstruction seemed to be due to an exaggeration of the hepatic flexure and after the gas once began to accumulate in the ascending colon and distend this portion of the intestine the obstruction became complete. There were no evidences of any inflammatory action at the site of the obstruction. The patient did not recover from the shock of the second operation.

In speaking of drainage Dr Haynes said he thought the most efficient method was to employ either a medium sized tube or two small ones. The flow was due not so much to capillary action as to the *vis a tergo* from the intra abdominal pressure. All we had to do was to provide a proper vent and the intra abdominal pressure would do the rest. In some cases it was necessary for the purpose of drainage to insert a strip of gauze to the site of the pelvic wound or intestinal anastomosis or gall bladder stump this was left for five seven or perhaps ten days and its removal was then usually attended with considerable difficulty. He recalled a case where a man was shot through the stomach and stomach contents had escaped into the great omental bursa which consequently was drained by a gauze wick. On attempting to remove this drain after about two weeks the adhesions were so firm that it was thought dangerous to persist in the usual way by twisting and loosening different parts of the gauze and the following device was utilized which has proven to be a time and pain saving measure. It consisted in threading a small uterine curette over the gauze by a rotary motion the adhesions were easily severed. After appendix operations the speaker thought it was better to invert the stump after excision and ligation. Dr McWilliams had shown that intestinal obstruction might follow in cases where the appendix was simply ligated and the stump removed and the speaker thought it was better to invert the stump.

DR L. W. HOTCHKISS said that about seven years ago he read a paper before this Society upon the subject of intestinal obstruction following acute appendicitis. In that paper he had reported three cases of his own and some twenty cases that had

been recorded by other members. The result of that investigation confirmed the observation just made by Dr. Gibson, that in a certain number of these cases, the obstruction was due to adhesions resulting probably from the character of the infection and from other factors over which we had no control. The speaker recalled one reported case where the loop of intestine which was the seat of the obstruction had been found on the opposite side of the abdomen.

Dr. Hotchkiss said the more common use of the cigarette drain and the less frequent use of gauze packing no doubt had much to do with the diminution in the number of cases of obstruction following abdominal operations. Personally, he believed in using comparatively little drainage in appendicitis operations unless it was necessary in the presence of local necrosis or for the purpose of removing extensive exudations, and then he thought it should only be used as a temporary measure and removed as soon as possible. In inflammatory conditions about the appendix, we had often to deal with essentially a protective process, which resulted in the formation of more or less fibrinous adhesions between the adjacent coils of intestine, in the effort to wall in the infectious foci. These adhesions rendered all efforts at effective drainage futile and under these conditions, gravitation did not of course lead to the pooling of the secretions in some one dependent part of the abdomen from which they could easily be drained. As to the reintroduction of gauze drainage, the speaker said he did not feel convinced that it was a preventive of secondary abscesses in itself. Most surgeons were getting away from prolonged drainage with results that were certainly better than before. He was in favor of removing the drain at the earliest possible moment, and allowing the wound to heal. The tube or flask drain was useful in some cases, but its own presence if prolonged doubtless led to an increase in the secretions and the production of troublesome sinuses.

Dr. Hawkes, in closing, said he was fully in accord with what had been said in regard to the possibility of intestinal obstruction occurring after appendicitis in spite of the most careful attention to technic. Still, there were cases in which the accident was distinctly traceable to faulty technic.

In regard to drainage, the speaker thought we could fairly conclude that we did not get actual peritoneal drainage from any

point remote from our drainage tract for more than eighteen hours after operation. Then we simply got serum from around the drain. In reply to Dr Haynes the speaker said he had never attached the omentum to the stump he had simply pulled down a free piece of omentum over the stump so that the upper part of the omentum rested on the caput coli. Personally he had never had a case of intestinal obstruction result from that method of treating the omentum nor had he ever inverted the stump of the appendix. He simply tied it off quite short touched it with a little carbolic acid and covered it with omentum when possible. A number of times he had had the opportunity to see the results of this method subsequently and he was scarcely able to find any trace of where the stump had been.

TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY.

Stated Meeting, November 2, 1908

The President, DR WILLIAM J TAYLOR, in the Chair

CONGENITAL DISLOCATION OF THE KNEE

DR JOHN B ROBERTS said that at the meeting of the American Surgical Association on May 9, 1901, he presented a paper reporting a case of arthrotomy for congenital anterior dislocation of the tibia¹ The girl, who was aged five years, was operated upon in March of that year through a large horse-shoe incision made across the front of the knee After division of the ligament of the patella and almost complete section of the lateral ligaments of the joint the dislocation was easily reduced A partial section of the four-headed extensor muscle of the leg was necessary in order to repair the cut ligament of the patella Some infection of the wound occurred and it became necessary to open it and thoroughly drain the knee-joint, using also irrigation with mercuric chloride solution and subsequently with formaldehyde solution After a number of weeks the child returned to her home with the bones in proper position, though there was still great restriction of motion at the knee-joint

He presented illustrations showing a skiagraph and photographs of the child before operation The photograph now presented (Fig 1) shows the child as she is at the present time Her physician, Dr F S Nevling, reports that the child, who is a dwarf, can now use the operated leg just as well as the other and needs no brace or support for it She can run and jump just like

¹Transactions of the American Surgical Association, 1901, and Annals of Surgery, August, 1901



Sb g ult f rth t myf co g t l d s t f th k th end f se years.

any other little girl. She is now about thirteen years old and has long since ceased to grow. The doctor thinks she is little if any taller than when she was operated upon at the age of five. Inspection of the photograph indicates that she is probably a cretin. She has a large head and prominent abdomen. Her expression, however, is not that of a child of very defective intellect. The scar of the operation on the left knee is shown on the picture and the legs appear to be of the same length.

She is somewhat defective mentally, but Dr. Nevling says she can care for herself and ask for everything she wants, but that she gets very cross if not humored. The parents have treated her like a baby and have not sent her to school. The physician mentioned has advised that they send her to school, but this has never been done. The other children are normal and bright. She has two brothers of adult age who are nearly six feet tall and weigh from 160 to 180 pounds each, and two sisters aged 17 years and 19 years who are bright and weigh from 125 to 150 pounds. There is another brother older than she and one younger. The latter is now 10 years old and weighs about 90 pounds. There have been no other deformities in the family and Dr. Nevling thinks that possibly the dislocation of the knee was caused during delivery of the mother, as she says that she had a very hard time at that particular confinement. He can give no reason for the child's ceasing to grow and being a dwarf.

RECURRENT ACUTE APPENDICITIS AFTER OPERATION

DR. GEORGE G. ROSS said that to a patient who has been operated on for an acute suppurative appendicitis and whose appendix has not been removed, the possibility and danger of another attack is no small matter. The actual occurrence of such an attack is not a rarity, and these cases offer additional difficulties at the second operation and bring to both the surgeon and the patient a realization of the shortcomings of the first.

During the past three months he had operated on three such cases, all at the German Hospital. In two the occasion for a second operation was an acute attack of appendicitis; in the third the procedure was for the relief of a persistent abdominal sinus.

The details of these cases are as follows:

CASE I.—Mr. H., aged 37. On September 27, 1907, patient was taken ill with appendicitis. He was treated medically, appar-

ently improved, and at the end of the second week passed about three pints of pus by the bowel in several evacuations. His chills and evening temperature however persisted, as did the tenderness and distress in the right iliac fossa. He lost forty pounds during his illness. He was finally sent to the Hospital and on October 31, 1907, an abscess to the right of the ascending colon was opened and drained. The appendix was not searched for. The patient, after a long convalescence, made an apparent recovery. On August 23, 1908, he was admitted to the German Hospital. He complained of not feeling very well and of a tenderness at the site of the old scar, which had been present for six months. Physical examination revealed an exquisitely tender mass the size of a man's fist beneath the old scar, which had given away, leaving an incisional hernia. An incision removing the superficial scar was made, opening the peritoneum in the line of the original incision. The adherent intestines were separated from the cicatrix and a postcæcal abscess cavity opened. Within it was found a gangrenous appendix sloughed in two. The appendix was ligated and removed, the abscess cavity cleaned out and drained by a rubber tube through the loin, and gauze anteriorly. The patient made an interrupted recovery.

CASE II—Mr C S, age 30, had been operated on three years before at the Bellevue Hospital, New York, for acute appendicitis. His wound was drained and he was told that his appendix had been removed. He was admitted to the German Hospital of Philadelphia, August 3, 1908.

His present illness began one week ago, when after an indiscretion in diet he had an attack of diarrhoea lasting all night. Since then he has had a desire to have his bowels move very often, yet passes but little fecal matter each time. At the same time he has had general abdominal pain. The night before admission the pain became acute and was localized to the right iliac fossa. He vomited once.

Physical examination shows the absence of rigidity or distention. There was an excessively tender mass beneath the old scar.

Operation, September, 1908. Old scar excised, intestines walled off with gauze pads and a pericæcal abscess exposed, the small amount of pus found was wiped away and an inflamed necrotic appendix found, which was ligated and removed, the

abscess cavity was drained by the means of a rubber tube and gauze Patient made an uninterrupted recovery

CASE III—Mr C G age 24 at the end of November 1907 was operated on for acute appendicitis He had been ill for three days before admission and had been treated by his physician with purgatives At the operation an abscess containing very foul pus was opened and drained The record of the case states that a gangrenous appendix was found and removed as a slough It is of interest in this case that threatened obstruction from contracting adhesions was averted by repeated daily doses of castor oil

Ever since the operation the patient has had a discharging sinus for which he came for operation in June 1908

At this operation after placing a probe within the sinus the old scar was dissected out in the usual way and the intestinal adhesions separated The sinus was found to communicate with the lumen of the remaining one inch long portion of the appendix This inch of appendix was removed a small drain introduced and the wound closed The recovery was uninterrupted and did not recur

Dr Ross further said that a consideration of the cases cited would direct our inquiries to several points (1) the liability to recurrence after the simple opening and drainage of an appendiceal abscess (2) the propriety of removing the appendix in cases in which the trouble outside of the organ is marked (3) the importance of operation before the trouble becomes extra appendiceal

The Liability to Recurrence—There can be no doubt that as long as any portion of the appendix in communication with the cæcum remains recurrent attacks are to be feared Could we predict in any particular instance what the subsequent behavior of the appendix would be it would be easy for us to determine whether to be content with the simple evacuation of an abscess or to search more thoroughly for the appendix Yet this is manifestly impossible

Sir Frederic Treves states that of 100 cases of appendiceal abscess operations which came under his observation 16 had recurrences and 8 subsequently had the formation of inflammatory exudates in the right iliac fossa no doubt appendiceal in origin—24 per cent then really had recurrences after operation

And while this distinguished author states that of 100 patients operated on by simple drainage of the abscess 84 did not have recurrence, I would reverse this method of presenting the facts and emphasize the point that 16 per cent to 24 per cent did have recurrence

Nor can any given patient, under such circumstances, be sure at any time, however remote, that he will not again be the victim of an attack of appendicitis. It is almost impossible for us to calculate the hindrance that such a constant apprehension must be

It is only in those cases in which the appendix has sloughed, disintegrated and really become a portion of the abscess mass that a recurrence is unlikely, and these, unfortunately, we are unable to recognize at operation unless one searches for the cæcum to locate the origin of the appendix. Twice in making such a search I have discovered a hole in the cæcum where the appendix had sloughed off. Several times in making a search for the appendix, unsuspected, isolated collections of pus have been discovered.

Nor is it necessary for the whole appendix to be present for us to have a re-awakening of the old trouble. Instances have been reported of cysts and infections of appendiceal stumps and Treves in his series of 100 cases found two in which subsequent trouble was due to pus formation in a mere stump of an appendix.

The leaving of such a portion of the appendix may occur in two ways

- 1 The operator may do this by faulty technic. This is doubtless a rare occurrence, particularly at the hands of any one who has had the benefit of observation before attempting to operate.

- 2 After opening an appendiceal abscess the sloughed appendix may be removed and a portion inadvertently be left. This would also seem not likely to occur, yet Case III is an illustration of this.

On the other hand while the distal end of the appendix may be comparatively free, the proximal may be a portion of an abscess wall which the operator does not wish to disturb.

Should the appendix be already sloughed off an examination of the cæcum will often reveal the fact that the line of separation is some distance removed from the junction of the cæcum and the appendix and that therefore a considerable stump is left, which must be removed.

This was the case in an instance encountered recently by a colleague Dr Whiting. In a case which he operated on the thirteenth day of the attack the entire distal end of the appendix was a slough a whitish string almost while a distinct stump was left the lumen being closed by healing that had already taken place.

As regards such spontaneously healed appendiceal segments we know that they can also remain harmless and retain their nourishment for indefinite periods and that their reinfection and inflammation gives rise to attacks and lesions entirely similar to an acute appendicitis.

Williams (*Brit Med Journ* 1907) has lately cited the curious instance of acute inflammation in an appendix entirely separated from the cæcum causing a typical appendicitis.

The lesions which we may expect from the remnant of the appendix or rather the pathological processes to which it may give rise may be classed as follows (1) acute appendicitis with or without abscess (2) continuation of primary infection or residual abscess (3) fistula.

An appendix left at operation for abscess is somewhat less liable to give another attack of appendicitis than one left unoperated in a mild attack. Yet the possibility is not remote. As might be expected in cases where there has already been so much damage to the structures of the right iliac fossa abscess formation in these cases is common. Case II is an example of this class. Here a man in good health for three years after an appendix operation becomes subject to another very acute attack with abscess formation.

A residual infection or one in which there has probably never been an entire subsidence of the infection about the appendix and a gradual abscess formation takes place as shown in Case I. As to symptomatology they furnish us with a picture of slow abscess formation with mild infection as opposed to the acute signs as in cases of class 2. As to pathological conditions within the abdomen and their treatment they furnish us with nothing that varies from those of the first class.

In class 3 the fistula cases we may really have two varieties (a) those in which the appendix portion or stump acts solely as an irritant in keeping open a sinus tract (b) those in which the sinus communicates with the lumen of the appendix either of the

appendix proper or of a sloughed segment, as in a case reported by Dr Deaver

It is not always possible to ascertain when the appendix is the underlying cause of the persistence of a sinus. Should we be able to exclude the possibility of the presence of a portion of ligature, etc., it will be probable that the fistula either arises from the stump of the appendix or is kept active by the presence of a fecal concretion, etc. It is but in a few instances that we see a sinus or fistula of long standing in which at operation some such cause is not demonstrable.

The treatment of such recurrent infections, residual abscesses, or fistulæ, is based upon one general principle, viz., to remove the primary cause of the trouble and to repair the damage done by it.

To leave the appendix a second time in abscess cases would be only to invite another attack and the formation of another abscess with a continuation of local infections finally leading to a general infection.

But far more important than the treatment of these conditions is the question of their avoidance at the primary operation. It is known that they occur after abscess or pus cases. The question then arises: What is the proper operative treatment for appendicitis and abscess?

The treatment of appendiceal abscess cases must have been carefully considered by every one who has had occasion to deal with a number of these cases.

Authorities have differed greatly as to the mode of approach, the method of incision and of drainage and the after treatment. Equally have they differed as to the method of dealing with the appendix in these cases.

Amongst many surgeons the simple evacuation of an appendiceal abscess is held to fulfil all the indications in such a case, and that the treatment of a case is such as would be applied to a simple abscess anywhere in the body. This is a method of treatment much more in vogue upon the continent of Europe and especially in Germany than among American and English surgeons. Mr Bottle has recently advocated secondary operation for the removal of the organ before the patient passes out of the surgeon's hands.

Others, such as Dr Morris, of New York, speak for the removal of the appendix in every case regardless of its location or relationship to the abscess wall, etc.

The large majority of surgeons heretofore however have taken the position held by Dr Deaver—that it is advisable to remove the appendix whenever it is not so situated in the wall of an abscess that to remove it would be to spread infection over the general peritoneal cavity

As will be seen the meaning of this statement varies largely with the surgeon applying it. In the opinion of the reporter the incision and drainage of an appendiceal abscess represents the most unsatisfactory of all operations for acute appendicitis. To operate upon a resultant pathological condition and leave the original focus and cause of infection *in situ* is opposed to all the fundamental principles of surgery

A primary incision with secondary operation for the removal of the appendix is no less unsatisfactory. As a rule patients can not be induced to return when they are feeling well even if they know that they may at any time become most gravely ill. This method also exposes the patient twice to anaesthesia and the discomfort and inconvenience of operation. Not only this but a second operation shows us instead of a free appendix or one covered by fresh adhesions easily loosened an appendix hidden and covered by adhesions often so dense that the removal of the organ becomes a surgical procedure of the greatest difficulty and danger

A decision must be made between those who would always remove the appendix and those who advise its removal as a rule but do not regard its remaining as a serious matter

He was not willing to say that the appendix should be removed in absolutely every case. But his experience with these recurrent cases that he had himself operated and others that had come under his observation leads him to believe that the cases in which the appendix should not be removed are rare indeed. Surgeons have been too fearful of hunting for the appendix in the presence of small amounts of pus too prone to hesitate in removing it from among adhesions or from the limiting membrane of an abscess

The leaving of the appendix in an acute abscess case is a serious matter. Such an incomplete procedure simply tides the patient over the acute condition and one should not be satisfied until the offending organ is in a bottle of alcohol. Until this happy event takes place the patient remains in a condition of no uncertain danger

He had left an appendix in but one case for two years and had not lost one of these cases as a direct result of the removal

But one other point remains,—instead of reoperating in abscess cases, surgeons should not have to operate on abscess cases at all. A case of appendicitis, diagnosed and operated early, cannot give rise to a fraction of the complications that delay brings with it. Operation should follow diagnosis at once and there would result clean cases, without drainage, mortality or complications

Unfortunately we seem to be far from this happy state of affairs. Sometimes it seems as if we were still in the pre-surgical stage, when the evacuation of an appendiceal abscess into the intestines, as in one of these cases, was esteemed a most fortunate result

To the average layman the word appendicitis is spelled OPERATION. Where then lies the fault for the large percentage of appendiceal abscesses still encountered?

Of 194 cases of acute appendicitis on the records filed so far this year, January to September inclusive, at the German Hospital but 79 or 40 per cent, were clean *i e*, early cases

Of 23 cases that he operated there during the summer but 10 were clean cases that could be closed without drainage

Since January 1, 1907, he had operated 161 cases of appendicitis,—100 at the German Hospital, 56 at the Germantown Hospital, and 5 at other institutions. Of these, 105 were clean cases which were closed without drainage, this included both chronic and acute cases. There was one death. The patient was a Jew and had, in addition to his appendix troubles, enlargement of the lymphatic glands of the mesenteric chain as far as the finger could reach. After operation he was extremely restless, became actively delirious and died promptly of exhaustion. A partial postmortem revealed nothing about the seat of operation to account for death. The glands were not malignant, probably tubercular.

Fifty-six cases required drainage for pus, either in localized collection or involving the entire peritoneal cavity.

So far as he could recall, or the records state, there was but one case in which the appendix was not removed. This man had been operated a year before at the Bellevue Hospital, N. Y., and reported at the German Hospital, September, 1907, with a sharply outlined abscess in the right iliac fossa, which was opened

extraperitoneally by an incision parallel to and above Poupart's ligament. He recovered and was discharged nineteen days later.

Three died—two of these had general peritonitis and sepsis which was very profound before operation and which did not improve; one of these died in the operating room of acute septic œdema of the lungs; the other had had intestinal obstruction for four days before admission. The third case was one of localized abscess presenting in the median line. The pressure of the collection had caused complete occlusion of the rectum. The surroundings of the abscess were necrotic from pressure necrosis. The patient had been ill for two weeks.

As far as could be traced the three cases of peritonitis were infections of the retroperitoneal space. Total mortality 2.4 per cent; non drainage cases 0.9 per cent; drainage cases including general peritonitis 5.3 per cent.

Dr JOHN H. JOPSON mentioned three cases of this kind operated within a few months of each other. One case was a patient Dr Wharton operated upon with the assistance of Dr Jopson; the other two cases were his own. These three cases emphasized the necessity of removing the appendix in all cases of abscess. He could recall only two cases in recent years where he could not remove the appendix. In one a careful examination of the cæcum showed it sloughed off and in the other it could not be found. In one of his own cases the child had had an operation for drainage of an appendiceal abscess a year or two previous, then had a second abscess at the time the appendix was removed and a third abscess after removal of the appendix.

It always seemed to him that to open an abscess and leave the appendix was a very unsatisfactory procedure and incomplete surgery. It had frequently been his experience when removing the appendix where there was an abscess to find fresh pockets of pus behind and around it.

One hears much less advice now in favor of leaving an appendix which forms part of the abscess wall. It is much less dangerous to remove such an appendix after careful protection of the uninvolved peritoneum than to leave it and run the risk of overlooking other purulent collections.

AMPUTATION AT THE SHOULDER-JOINT FOR EMPHYSEMA-
TOUS ("TRAUMATIC") GANGRENE

DR ASTLEY P C ASHHURST reported the case of Laurence S, aged 14 years, who walked into the receiving ward of the Episcopal Hospital on December 27, 1907. While at his usual work in a yarn factory he had caught his right arm in the machinery, and had had the skin squeezed off it from just above the elbow to above the wrist, by the revolution of two rollers. The skin hung loose like the inverted sleeve of a coat. A somewhat similar case, in which the skin had been squeezed off the hand from the wrist to the fingers, had recently been under treatment in the hospital, and as a considerable portion of this hand had been saved by conservative measures, the Resident Surgeon determined to attempt to save this second patient's arm. Accordingly, after thorough cleansing of the parts, the skin was stitched in place, leaving ample spaces for drainage through various rents in the tissues. The arm was surrounded with hot water bottles. It was considered barely possible, as the deeper structures were not injured, that some degree of union might take place, and that amputation, if it had to be done eventually, might be done through the forearm, and not at the middle of the humerus, as would have been necessary had it been done on admission.

The patient did well for twenty-four hours, when his temperature rose abruptly to 102° F, his pulse however not exceeding 104 per minute. On the third day after admission, at the morning dressing, a little emphysema was noticed in the forearm. The temperature had fallen to 100° F. The patient was isolated by direction of Dr Frazier. When seen by Dr Ashhurst in the afternoon, the emphysema had spread, and he urged amputation below the shoulder. Consent of the family could not be obtained, however, and in accordance with the advice of Dr Neilson, the sutures were all cut, and the limb was placed under constant irrigation, this being the only form of palliative treatment that seemed available. Free incisions were also made throughout the emphysematous tissues, thus relieving the patient's pain, and giving exit to quantities of frothy fluid. A culture was made from this fluid, and it was found that an air-producing bacillus was present, but unfortunately, owing to changes in the laboratory, the culture was mislaid before it was possible to determine whether the growth was due to the bacillus of malignant œdema,

to the *Bacillus aerogenes capsulatus* or to some other gas producing micro-organism

The next morning December 30 the patient appeared better and the local condition was no worse the fingers were absolutely gangrenous and the whole forearm as well as the elbow was numb The temperature was 100 F and the pulse 90 to 100 rather weak and very irregular The patient was clear in his head as on the previous days and did not present the aspect of one who was seriously ill The accompanying photograph (Fig 2) made on this date shows the appearance of the arm As the emphysema had not spread toward the trunk being sharply limited by the circular wound above the elbow where the skin had been torn loose it was considered safe to postpone amputation in the hope that a line of demarcation might form As a matter of fact the next day December 31 there was a suggestion of a line of demarcation at the border of the skin surface above the circular slough in the lower third of the upper arm The notes for this day read Forearm is emphysematous and gangrenous Gangrenous process does not appear to pass beyond point of sutures at elbow Several incisions made in forearm to liberate gas and fluid Upper arm is discolored for about two inches above line of incisions General condition good Pulse is irregular and slow but of good volume The pulse on this and the preceding day varied from 52 to 94 per minute No digitalis had been given

On the morning of January 1 1908 it is noted that there is slight crepitation for about one inch above line of suturing and the discoloration seems to have spread nearer the shoulder the upper arm is somewhat more swollen Pulse irregular and not so strong The temperature was just below 98 F and the pulse from 64 to 68 per minute

As it was evident that the infection by the gas bacillus had crossed the barrier set up by the solution in continuity of the skin and subcutaneous tissues produced by the original injury in the lower third of the upper arm amputation was decided upon at once It was found that the inner surface of the arm almost to the fold of the axilla was greenish in hue and that the only region from which a flap could be obtained was the deltoid accordingly amputation at the shoulder joint was done by Dupuytren's method using Wyeth's pins and an Esmarch band for

hæmostasis, cutting the deltoid flap from without inward, and the inner, short flap, from within outward, after disarticulating the humerus at the shoulder. A large rubber tube was left in the stump for drainage, and the flaps were not sutured tightly. The patient was much shocked, though only a few drachms of blood had been lost, and the operation had been completed with reasonable speed (about 25 minutes).

After the amputation the patient's temperature rose in a few hours to over 103° F, and by 4 A M the next morning reached 105.6° F, his pulse being about 138-148. At 4.30 A M he was given one pint and a half of saline solution, intravenously. This somewhat improved the force of his pulse. From the time the boy came out of ether, on the afternoon of January 1, to the morning of January 5, he suffered from the most frightful and violent traumatic delirium. He shrieked and yelled constantly, acting over and over again in his delirium the scenes of his accident, and throwing himself around on the bed so vehemently that he was with difficulty kept off the floor, even by strapping his ankles to the bed, and fastening his body by a sheet. During the first 72 hours succeeding the operation he obtained only six and one-half hours sleep, in two periods of about three hours each, in spite of the generous use of morphine, chloral, and hyoscine. Finally on the night of January 4, after a dose of paraldehyde, but perhaps merely as a result of exhaustion, he slept seven hours and a half, and awoke the next morning clear in his head. His temperature had gradually fallen, and after this date did not rise above 100° F.

The wound was dressed on the second day after the operation, to make sure that the gangrene had not affected the flaps, fortunately these were found in excellent condition.

To combat the toxæmia which seemed to be the cause of his delirium, he was forced to take as much liquid diet as possible. On the day after the operation, only 16 ounces of liquid nourishment could be taken, but this was supplemented by giving him a pint and a half of saline solution intravenously, as already mentioned. On the second day he took by mouth 68 ounces of fluid, and on the third day 65 ounces. No doubt it would have been beneficial to administer more saline solution intravenously, or by hypodermoclysis, but his delirium and tossing were so absolutely uncontrollable, that it would have been impossible to do either without the administration of a general anæsthetic. No record

F



Emphy mat ga gren

FIG 3



Amputation at shoulder joint for emphysematous gangrene

could be kept of the amounts of urine excreted as these as well as his bowel movements were passed in the bed

Two days after he came to his senses he was removed from isolation and returned to the general ward His recovery hence forth was uneventful A photograph made four weeks after operation shows the appearance of the stump (Fig 3)

This case is deemed worthy of record because of the rarity of recovery from emphysematous gangrene even after prompt amputation Although a case of this form of gangrene is received at the Episcopal Hospital every few years this is so far as can be determined the first case to recover In 1902 a man was admitted to the service of Dr Neilson with compound fracture of the left elbow joint one morning a few days after his admission he was found to have developed emphysematous areas in his arm above the elbow Three or four hours later when seen by Dr Neilson the emphysematous crackling had invaded the thorax and all thought of operation was abandoned the patient dying the same afternoon or evening In the summer of 1907 a patient who had been operated on for typhoid perforation in Dr Deaver's service developed emphysematous gangrene in the abdominal wound and died in a few hours

Dudgeon and Sargent (*Trans Pathol Soc London* 1905 lv1 42) refer to two cases of emphysematous gangrene due to the *Bacillus aerogenes capsulatus* following crushes both patients recovering after amputation Gayet (*Revue de Chir* 1908 1 575) has recently reported the case of a patient with compound fracture of the forearm which was repaired by operation and who developed benign gaseous gangrene but recovered without amputation in three months and a half

Writers in general recognize two main forms of traumatic or spreading gangrene (*gangrène foudroyant*)—the more serious form of malignant œdema caused by Koch's *Bacillus* in which variety the formation of gases is a secondary and minor characteristic and a less serious form due to any one of a number of gas producing micro organisms of which that most frequently encountered is the *Bacillus aerogenes capsulatus* of Welch Among other bacteria which may be the cause of emphysematous gangrene Freeman (*Keen's Surgery Phila* 1906 vol 1 p 340) mentions the *Bacillus proteus vulgaris* *Bacterium pseudo-œdematis maligni* and the *Bacterium coli commune*

The infection in the present case was probably due to one of the less malignant bacteria, and it seems not impossible that the delay in the emphysematous gangrene spreading toward the trunk may have been due to the form of the injury, which ripped the skin and subcutaneous tissues from around the arm above the elbow, thus leaving a gap in the lymphatic and cellular tissues between the infected and healthy parts, which completely encircled the limb, and prevented extension of the infection upward.

The slowness of the pulse (52 to 64), and the absence of local inflammatory reaction before the operation, are also noteworthy. These features, as well as the fact that emphysema developed before the parts became gangrenous, show that the condition was not one merely of putrefaction in already mortified tissues, a fact which is further testified to by the finding of gas-producing bacilli in the fluids of the part, before the gangrene itself was evident.

Dr Ashhurst expressed his indebtedness to his chiefs, Dr Chas H Frazier, and Dr G G Davis, in whose services the patient was treated, for the privilege of operating, and of reporting the patient's history.

TEMPORARY PARALYSIS OF LEFT VOCAL CORD AFTER EXCISION OF TUBERCULOUS CERVICAL LYMPH-NODES

DR ASHHURST also reported the case of Frank J S, aged four years, who was admitted to the Children's Hospital on July 28, 1908, in the service of Dr E B Hodge, Jr, to whom he was indebted for the privilege of operating and of reporting the operation. In February, 1908, this patient had had his tonsils removed at the Children's Hospital by Dr F R Packard, and shortly afterward developed measles, on account of which he was sent home. During his convalescence from the measles the lymph-nodes in the left submaxillary region became enlarged, and in spite of palliative treatment the swelling persisted. When he returned to the hospital in July, there was a firm, nodular mass in the left submaxillary region, the size of a goose egg, seven or eight more or less fused nodes being palpable through the skin. Operation was undertaken July 30, 1908. Through Dowd's incision parallel with the border of the mandible, and about an inch below it, the mass of lymph-nodes was removed entire. They surrounded the great vessels for a distance of about two inches and a half, a distinct groove being left in the specimen where the vessels ran.

The hypoglossal nerve and descendens hypoglossi had to be dissected out of the inflammatory mass and in so doing profuse hemorrhage arose thought to be from a puncture of the internal jugular vein. The bleeding vein was clamped but as the hemorrhage was then seen to come from a longitudinal slit and not from a mere puncture of the vein it was impossible to apply a ligature satisfactorily so the rent in the vein was sutured with fine chromic catgut. When the hemorrhage had thus been effectually stopped it was seen that the tear had not been in the internal jugular itself but in the temporomaxillary vein close to the trunk of the jugular as part of the mass of lymph nodes lay below this vein it was accordingly ligated in two places and divided between the ligatures in order to facilitate the operation. The deep fascia was closed with buried sutures of chromic gut and the skin with silk worm gut a small gauze wick being inserted for drainage. The duration of the operation was one hour.

As the child had shrieked continuously for fifteen minutes before the anæsthetic was started it was without much surprise that he was noticed to be very hoarse the next day. But as this hoarseness persisted with no appreciable diminution for two weeks it was considered wise to have a laryngoscopical examination made as it was feared the superior laryngeal nerve had been injured. Dr Packard very kindly examined the child's larynx and reported as follows. I only saw him once and it was pretty hard to make an accurate diagnosis as he was very nervous. I thought at the time that there was a partial paralysis of the vocal cord on the side upon which the operation had been performed and which I attributed to injury of the recurrent laryngeal nerve. Of course if his superior laryngeal had been injured there would have been loss of sensation in the laryngeal mucous membrane and the paralysis in such cases is never quite as marked as it appeared to be in the case which I examined. I have seen at least one other case of this kind in an adult who had had tubercular cervical glands removed from her neck following which she developed hoarseness and the vocal cord on the side which was operated upon was in a cadaveric condition. She regained the use of her voice completely. I think in these cases the recurrent laryngeal must be injured by being pulled upon or pressed and as it is not completely severed it recovers spontaneously after a greater or less lapse of time.

The hoarseness gradually diminished, and eventually disappeared completely, as did the slight facial paralysis present immediately after the operation

If the injury had been to the recurrent laryngeal nerve, it seems certain that it must have been produced indirectly, by pulling upon the trunk of the vagus while dissecting the lymph-nodes off the great vessels, if the paralysis of the vocal cord was not due to injury of the fibres of the recurrent laryngeal nerve, then it must have been caused by injury to the superior laryngeal, which supplies the cricothyroid muscle and through stimulation of this muscle elongates the vocal cord of the same side, by elevating the anterior border and depressing the posterior border of the cricoid cartilage

ACUTE PANCREATITIS

DR JOHN B DEEVER presented the following case history
Male, age 27 years One year before admission to hospital had four or five attacks of abdominal pain accompanied by jaundice

Two and a half weeks before admission had severe attack of epigastric pain accompanied by nausea and vomiting Pain continued to day of admission, with frequent exacerbations Pain started in epigastrium, referred to lower abdomen, back and shoulders Has been jaundiced more or less ever since onset of this attack

Physical Examination—Patient is jaundiced, the respiratory excursions are limited, the respirations are short Liver extends from the sixth interspace to two finger-breadths below the costal margin in the mammillary line There is slight epigastric fulness and spasticity of both recti muscles Some tenderness over entire epigastrium, quite marked over Mayo Robson's point The pain continued without relief up to the time of operation Temperature on admission 98.4°, and, during entire course of illness, febrile for only about three days after operation, with a maximum of 100.4°

Operation—Incision through right rectus The gall-bladder was found adherent to colon and omentum and contained calculi Posterior to the stomach there was a soft, fluctuating mass about the size of two fists, pushing the stomach forward The finger placed in the foramen of Winslow found this to be in the position of the pancreas The gall-bladder was walled off with gauze pads and aspirated Forty cubic centimetres of mucopurulent fluid

were removed. This was sterile as shown by culture. The gall bladder was then incised and four large and twenty four small stones were removed from it and the cystic duct which was dilated. Tube drainage was introduced into the gall bladder and the gall bladder sewn to the parietal peritoneum. The choledochus was patulous. The laparotomy wound was closed after placing a gauze drain in the subhepatic space.

The patient was then placed on his right side and an incision made in the left loin extending down 7 cm from the costal margin and just external to the outer border of the erector spinæ. In the fatty capsule of the kidney there was much fat necrosis. An abscess was evacuated in the location of the pancreas and about half a litre of bloody purulent fluid escaped. The cavity was drained with a large rubber tube and two pieces of gauze.

The patient made an uneventful and practically afebrile recovery. The drain was left in the gall bladder eleven days and in the posterior incision for several weeks although the drainage gauze in this incision was all removed in six days. The discharge from this wound was found to be very irritating to the skin.

Dr Deaver remarked that this case presented these points of interest: (1) The slow pulse and afebrile course. (2) the presence of biliary calculi—for which the operation was performed. (3) the presence of fat necrosis in the abscess cavity. (4) the irritating character of the pancreatic discharge.

THE VALUE OF THE CAMMIDGE REACTION IN THE DIAGNOSIS OF PANCREATIC DISEASE

DR EDWARD H GOODMAN read a paper with the above title for which see page 183.

DR JOHN H MUSSEY (by invitation) said that in the main he agreed with the writer feeling that there is in this test a symptom or sign of great significance in the diagnosis of pancreatic disease. In the previous reactions as described by Cambridge however he had felt that there was very little of satisfaction and he had so reported at the Association of Physicians a few years ago. There were good chemical reasons for one to feel that perhaps the reactions were artificial rather than arising from the occurrence of any pancreatic disease or any change in the urine the result of pancreatic disease. The C reaction has proven much more satisfactory however in the few cases observed but as Dr Goodman has said one must consider it only an aid a

suggestive, but certainly not a pathognomonic, sign in pancreatic disease

He had just recently put on record nine cases of acute pancreatitis. Four had been under the care of surgeons and three got well. The fourth was seen very early in our studies of pancreatic disease, as long ago as 12 or 15 years, and while an abdominal section was done in the presence of the extraordinarily large accumulation of blood, it rather made the surgeon hesitate to go further than to do an exploratory operation, and in consequence—or perhaps it would have happened anyway—the patient died. In the present time more heroic measures might have been carried out and the patient's life been saved. Of the five remaining cases three died and two got well, so that a person with pancreatic disease may get well without surgery, and therefore one must consider that acute pancreatic disease is in part,—that is up to a certain degree,—a medical affection, but the time comes very soon when it is a surgical disease. That borderland, so far as known at the present time, is not so distinct as one would like to have it, but it cannot really be said that in every case of pancreatitis an operation should be done, and perhaps more particularly not because of the pancreatitis but because of the associated features in connection with the various cases. Pancreatitis is more frequently seen in patients past 50 or 60, who have other lesions, particularly degenerative lesions of the heart and blood-vessels, which may prevent operative interference. Under such circumstances perhaps life is not in quite as much peril as if operation were resorted to. In his experience the patients who got well were both young subjects, for the patient who died, an autopsy confirmed the diagnosis of pancreatitis. It is not an easy matter to make a diagnosis of pancreatic disease in acute pancreatitis. Of the nine cases mentioned five were women, four men, and five of the number were over 50 years of age.

DR WILLIAM L. RODMAN said that this test of Cammidge had been too long neglected by American physicians and chemists. It has been used with great advantage in England. In Leeds six years ago Robson and Moynihan spoke optimistically of this test in pancreatic disease and cholelithiasis. Neither liked to do an operation without the opinion of Mr. Cammidge, and both have reported, at that time and subsequently, that he was almost invariably right. He did not know why it was that the test had not

been more satisfactory in this country unless perhaps it was due to the fact that it is such a complicated procedure and requires a skilful technic in order to obtain results. It is certain that in the right hands and made in the right way it is a good test. The experience he had had with the test led him to believe that it was most valuable. Of course it may not be a pathognomonic sign but that it is a really substantial aid in cholelithiasis and in pancreatic disease there was not the slightest doubt. The test is not apt to be positive in carcinomatous pancreatitis. It is in chronic pancreatitis that it finds its best field of usefulness.

DR JOHN B. DEEVER in closing said that he was inclined to take the same view that Dr. Goodman had brought out in his paper. He agreed with Dr. Musser entirely when he speaks of a case of acute pancreatitis as being medical in the beginning of the attack. He also agreed with him as to the difficulty of diagnosis in the great majority of these cases and certainly he felt that this test should be made at any rate before operative interference was resorted to particularly in acute pancreatitis. His experience in acute pancreatitis—and he had seen a number of cases—was that one should not be in too great a hurry to open the abdominal cavity. In cases where he had had the best results he had operated posteriorly and this is what he proposed doing in the future if he could locate the lesion.

THE VALUE OF OPERATING IN TWO STAGES IN STRANGULATED HERNIA WITH THREATENED GANGRENOUS PERFORATION

DR JOHN B. ROBERTS said that inspection of the intestine after opening the sac of a strangulated hernia sometimes leaves the surgeon in doubt as to the wisdom of returning to the abdomen a coil upon which there are dark spots suggesting approaching gangrene. This is not an infrequent occurrence after exposing to view a portion of gut which has been tightly constricted by Gimbernat's ligament in femoral hernia.

Resection of the suspicious area or the formation of an artificial anus at the time the kelo-tomy is done are eminently proper procedures when there is no doubt of the impending death of portions of the wall of the gut. Pushing the suspected part of bowel just within the inner ring of the hernial canal and providing for drainage have often been used.

A year ago he operated with local anæsthesia upon an old woman in feeble health with a tightly strangulated femoral hernia. He found a black line running around the gut where the ligament of Gimbernat had exercised linear pressure. The general condition of the patient and the suspicious character of this dark line made him doubtful as to what was the safest procedure. Resection seemed a serious risk and to replace the gut without waiting for more definite knowledge of the extent of damage appeared unwise. He finally concluded to allow the intestine which had been relieved of constriction to hang out of the wound. It was covered with a sterile dressing with the idea that in a day or two, he would know definitely whether or not perforation would take place from devitalization. The result justified this action, for a day or two afterwards the healthy condition of the exposed loop showed that all danger of gangrenous perforation had passed. He then, without general anæsthesia, loosened up the plastic adhesions which were easily broken and reduced the hernia. The wound was then closed and the patient made a prompt recovery.

It is likely that many surgeons have acted in this way under similar circumstances, but he had never done so, being willing in other cases to finish the kelotomy in one stage.

THE RELATIVE MERITS OF SUPRAPUBIC AND PERINEAL PROSTATECTOMY

DR JOHN B DEEVER presented three specimens of prostate glands recently taken out, the smallest of which was removed for a chronic prostatitis with persistent urethrovesical catarrh, and the two larger for obstruction, both of which were of the soft adenomatous type. The larger of the prostates weighed 9 ounces, and was the largest gland he had ever taken out. Both of the patients were 80 years of age, they were both sitting up in bed on the fourth day after operation.

The points he wished to raise for discussion were the following: That the suprapubic method is the method of choice in large adenomatous prostates under all circumstances, that the small adenomatous, as well as the hard prostates, be they fibrous, tubercular, carcinomatous, or sarcomatous, are possibly best attacked by the perineum, the so-called Young operation, that greater damage to the bladder results from the infrapubic removal of the

prostate in large adenomatous prostates (and the hard prostate where the sheath of the gland is closely adherent) that the rectum is more likely to be injured in the infrapubic operation than a permanent fistula urinary incontinence and secondary hemorrhage are more likely to follow the infrapubic operation

When secondary hemorrhage occurs after the infrapubic operation the control of which entails packing the perineal wound urinary incontinence and fistula are greatly favored. The primary bleeding while it is greater in some cases in the suprapubic operation it is more easily arrested by packing the cavity made by removal of the gland and particularly purse stringing with a catgut suture the mucous membrane around the opening of the cavity. Secondary hemorrhage seldom occurs following the suprapubic while this cannot be said to be the case in the infrapubic operation. Though the prostatic urethra is destroyed in the majority if not in nearly all suprapubic operations the ultimate result is as good as when the urethra is saved. The one thing however in favor of leaving the prostatic urethra is the lessened chance of stricture following. That stricture follows both the suprapubic and the infrapubic method in a percentage of cases is true. The question of preserving the ejaculatory ducts in the large adenomatous prostates occurring as they do at an advanced time of life to his mind cuts no figure. Again he deemed it better practice to remove the adenomatous gland entire than to leave the portion forming the floor of the prostatic urethra on account of the likelihood of recurrence of obstruction from increased growth.

That the power of voiding urine occurs as early in the suprapubic as in the infrapubic is quite true. That the infrapubic operation calls for a master hand if it is to be carried out with the least amount of risk to the surrounding structures he admitted to be so but in either operation the more expert the operator the better must be the results. That the mortality of the two operations is practically the same in equally good hands is true providing the statistics are honestly made and not doctored. That the ultimate comfort of the patient is greater following the suprapubic method in the class of cases he regarded as fitted for it he was sure was so. He had done a sufficient number of operations by both routes to convince him that he was correct in making this statement.

That the chief factors in the mortality following either operation in advanced life are governed by the functioning ability of the kidneys and especially the great care and judgment in the after-treatment, he knew to be so

One of the most important symptoms in connection with enlargement of the prostate, and fortunately comparatively rare, is free hemorrhage. Free bleeding endangers the life of the patient from retention and clotting in the bladder, which can only be thoroughly emptied by suprapubic incision. It was his experience that the danger to life under these conditions is greater than the operation of suprapubic prostatectomy under favorable circumstances. He had known patients to lose as much as one pint of blood at a urination. A repetition of the loss of this amount of blood demands at least that prostatectomy be seriously considered.

The infrapubic removal of the prostate in some of the cases of gonorrhoeal chronic prostatitis and vesico-urethral infection is the only thing that offers permanent relief. This will not be disputed by those who have had much experience with this troublesome class of cases and with the operation under these conditions. He protested, however, against the indiscriminate selection of these cases, and wished to warn the young surgeon of the responsibility he assumed when advising the removal of the prostate in this type of cases. Further, he never performed this operation without having told the patient of the risk of injury to the ejaculatory ducts, this should not occur, however, yet that it can occur is true.

BOOK REVIEWS

DISEASES OF THE BREAST with Special Reference to Cancer By
WILLIAM L. RODMAN M.D. LL.D. Professor of Surgery
in the Medico-Chirurgical College of Philadelphia P
Blakiston's Son & Co 1012 Walnut Street Philadelphia
1908

The present treatise forms a connecting link between our present day knowledge of it and the works of Cooper and Gross on this subject. Although the author's own opinions are expressed most positively due consideration has been given to those of other well known operators and investigators as is indicated by continual references. The literature of the subject has been very exhaustively reviewed. Statistical investigations seem to have been accorded a most careful review and the results derived from the compilation of the reports of many hospitals give the author opportunity to draw conclusions from a much larger number of cases than any that have been published hitherto and are in some instances at variance with those which are usually accepted. Thus for example a study of a large number of cases of tumor shows that benign growths are more frequent than they have been supposed to be and again that sarcoma is less frequent. The more important of these statistics are shown graphically in order that the relative frequency age incidence etc. of various neoplasms can be seen more readily without having to refer to the text.

Carcinoma as might naturally be supposed is given the greatest amount of consideration its pathology symptoms diagnosis prognosis and treatment are very fully and analytically discussed and throughout one is impressed continually with the strong plea which the author makes for early and radical operative interference stating quite positively that such treatment will offer a cure of the disease in a large number of cases. The most approved operative procedures are described in detail and the relative value of each discussed the successive steps of the opera

tion being plainly portrayed in numerous illustrations. The author's technic is shown in ten full-page plates.

The author states that when a carcinomatous tumor is situated in the upper hemisphere it is his custom to make a supraclavicular incision and to explore the posterior triangle of the neck. And, again, on page 296, he states that the chain of lymphatic vessels passes from the breast over the clavicle to empty into glands in the posterior cervical triangle. The importance of the subject would perhaps have warranted some more specific and detailed directions on this head. Attention might well be directed to the fact that there is a distinct set of vessels draining the upper part of the breast, which passes over the clavicle into the supraclavicular glands, also that there is a subclavian channel given off from the posterior surface of the mamma, which, after perforating the pectoralis major, runs between this muscle and the pectoris minor to empty into the subclavian glands, the former are situated for the most part in the supraclavicular triangle—or, as it is possibly better called, the subclavian triangle—bearing also an intimate relation to the sternocleidomastoid muscle, and, further, have tributaries extending to the apex of the anterior triangle, particularly in its inferior carotid or muscular section. Thus in removing any traces of metastasis, the lymphatic chain which bears an intimate relation to the subclavian vein, and those which are in relation to the sternocleidomastoid muscle, and, again, those which are found in the lower portion of the anterior triangle, should also be sought for and dissected out, as well as those which the author seeks in his exploration of the subclavian triangle. It is probably this that he has intended to convey in the text and that it is only the phraseology used which makes it confusing.

The inflammatory diseases of the breast, the chronic, infectious granulomata and benign neoplasms have been accorded the space which their importance deserved. Particular attention should be called to the chapter on tuberculosis and to the method of removing benign neoplasms by Warren's operation of plastic resection of the breast.

The illustrations of the book are exceptional in their number, accuracy of portrayal and beauty of execution, many being in colors which are very realistic.

DISEASES OF THE RECTUM ANUS AND SIGMOID COLON By F SWINFORD EDWARDS FRCS Senior Surgeon to St Mark's Hospital for Diseases of the Rectum Surgeon to the West London Hospital etc. Third Edition Octavo 442 pages 102 illustrations London J & A Churchill Philadelphia P Blakiston's Son & Co 1908

The last edition of this book published sixteen years ago had become more or less obsolete so that a complete revision has been necessitated in order to bring it up to present day teachings on the subjects treated To the former work have been added chapters on the sigmoidoscope and the operative treatment of malignant disease of the rectum and sigmoid colon The chapters on fistula procidentia recti sigmoidopexy and colotomy have been especially amplified The author in dealing with the subject of hemorrhoids makes particular mention of the Salmon operation it being in his experience the most expedient exception I think may be taken by many men to this conclusion The procedures as described in the operative treatment of malignant disease are in many cases not clear certainly there is much more to be said on the subject than has been stated in this book

The trend of the work impresses one as schematic in many instances the treatment of the various conditions being merely indicated and not specifically stated The book forms as a whole rather a review of the work of the author himself during the past thirty years than a comprehensive review of other authorities and may be better appreciated by the specialist than by the general practitioner while the personal element really adds to the interest and value of the book

A SYNOPSIS OF SURGERY By ERNEST W HEY GROVES John Wright & Sons Ltd Bristol 1908 pp 486

Epitomes and synopses are sometimes pitfalls instead of aids to the student If they encourage him to mere memorizing they are certainly harmful On the other hand if they are associated with and subordinate to wider and fuller teachings and used only as jogs to memory not as the main source of information they may be of great value

With this limitation Mr Hey Groves Synopsis is worthy of hearty commendation

It is based on sound teachings, is systematic, and is full enough to present the salient facts of surgical practice in an orderly and convenient manner, so arranged by means of headings, type and indented margins that they can be easily and rapidly referred to

The book gives internal evidence of having been made up, as the author states, from notes used in preparing students for examinations, but there is little to criticise. There are trifling omissions, *e g*, there is no description of fractures of the foot, or of its separate bones, or of fracture of the sternum, and under Potts' fracture there is no adequate mention of the common posterior subluxation, and there are a few slight errors of fact,—thus it is said that in cases of loose body in the knee-joint “locking does not occur,” which is much too absolute, occasionally the English is not above reproach,—in the treatment of antral disease one method recommended is “removal of offending tooth and drainage through a metal tube inserted *into this*”, and there are a few typographic errors,—“Fracture of Scapular” (in index)

On the whole, however, it is a very good book, and if one were asked to name a better one of its kind and size it would be found difficult to do so

EMERGENCY SURGERY, FOR THE GENERAL PRACTITIONER By JOHN W. SLUSS, A M, M D, Professor of Anatomy, Indiana University School of Medicine With 584 illustrations P. Blakiston's Son & Co, 1012 Walnut Street, Philadelphia, Pa, 1908

This book forms the fifth in a series of eight medical manuals which are to be published by P. Blakiston's Son & Company. The volume is of convenient size to be carried by the general practitioner and lends itself to this end by its flexible cover and rounded corners. It does not in any way attempt to take the place of any of the larger text-books of surgery, and does not go into various methods of operative procedure, the most approved method being usually the only one mentioned. The illustrations are profuse and instructive, particularly those illustrating the reduction of hip and shoulder dislocations. Consideration of some of the subjects cannot really be included under the head of emergency surgery, that however, does not detract from the usefulness of the book.

CORRESPONDENCE

VAS DEFERENS ANASTOMOSIS

EDITOR ANNALS OF SURGERY

IN the issue of the ANNALS for November Dr Gwilym G Davis reports a plastic operation upon a divided vas deferens. As a further contribution to the subject I desire to call attention to an article concerning a method of securing anastomosis of such a vas which was published by me in the *British Medical Journal* January 2 1904. The following is the method I used in the case under my care.

An oblique incision was made along the course of the inguinal canal similar to that used in the operation for the radical cure of an inguinal hernia. The spermatic cord was exposed and the testis dislodged through the wound carrying with it a swelling the size of a large pea which was situated in the course of the spermatic cord about one inch above the testis. This turned out to be a collection of semen confined in a fascial sheath between the ends of the divided vas deferens. The vas was found to be completely divided and its ends were separated for about half an inch.

The testicular end of the vas deferens was cut obliquely by means of a cataract knife. The distal or urethral portion of the vas was split up longitudinally for about one inch. This free end was further divided up for about half an inch from its extremity so as to provide two tails of equal size. In other words each tail consisted of one half of the longitudinally split vas deferens. The obliquely cut free end of the testicular portion of the vas was placed with its lumen in contact with that of the testicular portion and was fixed by means of fine silk sutures as closely applied as the whipcord like tube would admit. The two tails of the distal end were then enveloped round the testicular portion of the vas in order to counteract the disruptive force of the weight of the testis. Afterwards layers of fascia were wrapped round the anastomosed vas deferens and fixed by sutures.

I found it necessary to form the tails in order to secure a firm and permanent approximation of the divided end. It seemed to me that end-to-end anastomosis was not practicable, owing to the smallness of the tissues for suturing. Invagination of the ends was impossible on account of the rigidity and size of the walls of the vas deferens.

One can demonstrate the practicability of the above method of anastomosis of the vas deferens on the cadaver by injecting fluid along its lumen by means of a syringe.

As far as I know this case is unique, and I venture to record the method I devised on account of its being, I believe, a suitable operation in the conservative surgery of an injured vas deferens.

In this case there has occurred absolutely no atrophy of the testis.

J LYNN THOMAS, C B , F R C S

CARDIFF, ENGLAND

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should take two antikamnia tablets. Most all patients tell us they know by certain symptoms when an attack is about to come. To these patients we can do nothing better than give them antikamnia tablets to be carried around with them always ready for use. They are prompt in action, and can be depended upon to produce the most soothing anodyne action. In this country and also in England these tablets are largely employed, with results that have caused them to be depended upon by the best observers in both countries. The remedy, having none of the drawbacks common to other agents of this class, is eminently fitted to be applied in the treatment of the cases just described."

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ANNALS OF SURGERY

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SIR WILLIAM MACEWEN MD LL.D

L. L. F. A.

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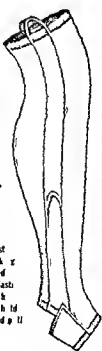
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ANNALS OF SURGERY

VOL LI

APRIL 1910

No 4

ORIGINAL MEMOIRS

STOVAINE SPINAL ANÆSTHESIA

A REPORT OF TWENTY CASES

BY LLOYD NOLAND M D

OF THE CANAL ZONE, PANAMA

Chief Surgical Clerk U. S. Navy

THE medical literature of the United States has been for a long time signally silent on the subject of spinal anæsthesia. This has been due I believe to unsatisfactory results with the drugs commonly in use—namely cocaine, tropococaine and novocaine—in regard to both operative and post operative results.

Some two months ago I had my attention called to stovaine by Dr. Pedro Obarrio of Panama who had been using it successfully for some time. Since giving stovaine a trial I am convinced that this drug is far superior to any other I have used or seen used for spinal anæsthesia and believe that in most cases requiring operation below the level of the umbilicus it is superior to anæsthesia by inhalation for the following reasons:

1. *Heart Action*—Stovaine has no apparent effect on heart action beyond a slight decrease in the pulse rate all of our cases having had a rate not above 80 to 90 during operation. Two cases in the small series below—one of strangulated in

guinal hernia and one of hydrocele—had marked organic lesions of the heart, but in neither case was there any untoward result from the anæsthetic

2 *Respiration*—Respiration was not affected, one case only in the series having complained of difficulty in respiration, which lasted but a few moments

3 *Muscle Rigidity*—There was no muscle rigidity, the abdominal muscles being more relaxed than under deep ether anæsthesia. The hemorrhoid cases showed a more relaxed condition of the sphincter ani than I have ever seen during safe ether anæsthesia

4 *Kidney Action*—The action of the kidneys seems in no way interfered with. The cases in the series passed normal amounts of urine free from albumin or casts

5 *Vomiting*—One case only, in the series, vomited during operation, this being more of a regurgitation than true vomiting

6 *Sweating*—Sweating during operation is by no means as marked as that generally seen under ether

7 *Intestinal Peristalsis*—It has been noticed that peristalsis is less active and that the intestines are more easily controlled by sponges than during ether anæsthesia

8 *Postoperative Phenomena*—I have had no case of postoperative vomiting or shock such as follows inhalation anæsthesia, and no case of severe head or back ache. None of the cases had retention of urine such as is common after inhalation anæsthesia in cases of operation on the lower abdomen and rectum. Postoperative pain seems much less intense, and is more easily relieved. There were no cases of fecal or urinary incontinence. Postoperative intestinal paralysis and distention were much less marked than is common in cases following operation under ether anæsthesia. No case in the series has shown a postoperative rise of temperature above 101° F

Stovaine can be secured in sterile solution, in sealed glass ampullæ, or solutions can be made as the individual surgeon desires. I have used the French preparation in ampullæ of

two sizes containing two solutions of the drug. The first containing 10 cc of stovaine in 1 cc normal salt solution has been used in all cases of abdominal section, herniotomy, etc. the second containing 5 cc of stovaine in 1 cc normal salt solution has been used in more minor work. The necessary apparatus consists of two glass hypodermic syringes of the Luer type with slip joint, one equipped with the ordinary short hypodermic needle and one with a slender needle about three inches in length.

Two points of puncture have been used—viz. the lumbar dorsal between the twelfth dorsal and first lumbar vertebrae and the ordinary classical puncture between the third and fourth lumbar vertebrae. The higher puncture gave perfect abdominal anaesthesia and the lower was used for operations on the rectum, perineum and lower extremities.

Technic—The patient should be prepared as for inhalation anaesthesia. When placed on the operating table he should be put in an upright sitting posture with the back well flexed or where this is impossible or ill advised he may be placed on his side with the head and knees drawn well together. The region where the puncture is to be made and the hands of the operator having been thoroughly sterilized, the upper margin of the selected interspace is marked by the left thumb which should be carefully kept in this position. The skin and deeper structures to the depth of about one inch are now infiltrated with a small amount of 1 per cent cocaine solution using syringe No. 1 and short needle. The long needle detached from its syringe is now inserted directly in the median line just below the marking thumb and at an absolute right angle to the spinal column. If correctly placed there should be but little resistance. If decided bony resistance is felt the needle should be entirely withdrawn and reinserted. As the arachnoid is entered the cerebrospinal fluid escapes from the needle; this should be stopped as soon as sufficient fluid has escaped to render it certain that the cavity has been entered. The syringe containing the stovaine solution is now applied, the injection made, the needle withdrawn and the site of the

puncture covered with collodion. Anæsthesia is usually complete in about one minute with the 10 cg dose and lasts at least one hour.

The operations in which I have used this method are as follows:

Appendectomy, 2 cases, vaginal section for pelvic abscess, 3 cases, inguinal herniotomy, 2 cases, salpingectomy (abdominal), 2 cases, abdominal exploratory, 1 case, perineal urethrotomy, 3 cases, amputation, mid-thigh, double, 1 case, Whitehead's operation for hemorrhoids, 2 cases, Andrew's operation for hydrocele, 4 cases. Total, 20 cases.

The cases cited have all made good recoveries. The longest time required for any operation was forty-two minutes.

The advantages claimed for stavaine as a spinal anæsthetic are as follows:

Safety over inhalation anæsthesia in cases showing heart or pulmonary lesion, diminution of surgical shock, ease and rapidity of administration, and the almost entire lack of the distressing postoperative symptoms so commonly following the use of other agents, either by the inhalation or spinal method.

TERMINAL ARTERIAL ANÆSTHESIA

BY J LOUIS RANSOHOFF M.D.,

OF CINCINNATI OHIO

SINCE the introduction of cocaine anæsthesia into surgery there has been a constant tendency to its wider application even to its use in the so-called major operations. With the exception of spinal anæsthesia the methods of local anæsthesia now in use are not true anæsthesias but rather analgesias. That is the patient while perceiving no pain feels distinctly what is going on. This in nervous patients is of great moment causing much discomfort and actual suffering.

What I hope to show is a method of perfect local anæsthesia applicable it is true only to a certain group of cases in limited areas of the body. The anæsthesia is induced by the injection of cocaine solution directly into the artery supplying the area to be anæsthetized. The following printed in the *Lancet Clinic* is the original case report.

CASE I—Male aged 7. On service of Dr Robert Carothers through whose courtesy I am enabled to report this case. The patient had been suffering for three years from a chronic osteomyelitis of the hand which became so painful as to necessitate an amputation. His age and condition contraindicated general anæsthesia.

Operation at Good Samaritan Hospital July 1 1909. An Esmarch bandage was applied about the arm two inches below the insertion of the deltoid. Under infiltration anæsthesia the brachial artery was exposed and the needle of a hypodermic syringe inserted into its lumen and 1 cc. of a 1 per cent cocaine solution injected into the artery in the direction of the blood current. In 10 minutes anæsthesia was absolute and anti-brachial amputation done without the patient's knowledge.

There are two features of special interest in this case the rapidity of anæsthesia and the fact that the operation was performed without the patient's knowledge. After the operation had been completed the patient asked when we would begin. This absolute anæsthesia is a salient feature of this method as well as one of its greatest advantages.

CASE II—Female aged 50 service of Dr Robert Carothers Cincinnati Hospital. Diagnosis Osteoma of scaphoid bone.

Operation—Esmarch strap applied lightly above knee. Under

infiltration anæsthesia the anterior tibial artery was exposed just above the ankle, and 1 c c of 1 per cent cocaine solution injected into the artery. This was immediately followed by complete anæsthesia of the entire foot, during which the osteoma was removed without the patient suffering the slightest pain. The further history was uneventful.

A series of animal experiments was now done to determine the certainty of anæsthesia, its safety and its applicability in operations other than amputations. In all, ten experiments were done. The first series in rabbits, the second in dogs. It will be seen that in operations other than amputations a 2 per cent cocaine solution is too strong to be consistent with safety, because of the danger of absorption into the general circulation. A 0.5 per cent cocaine solution was used and found in every way adequate.

In the experiments on rabbits, the femoral artery was selected as the site of injection. The artery was exposed in the upper part of Scarpa's triangle. One c c of 0.5 per cent cocaine solution was injected into the artery in the course of the blood stream and tests for anæsthesia were immediately made. The experiment was in each case controlled by testing the sensibility of the other leg and distant parts of the body. The following uniform results were obtained. Irritation of the anæsthetized leg caused no response, that is, the animal gave no evidence of pain as, for instance, by drawing away the leg. Irritation of the opposite leg was invariably followed by all the evidences of pain.

Experiment 1. The bone was exposed as roughly as possible, the knife rubbed up and down the bone, stripping the periosteum. No pain.

Experiment 2. The femur was broken by manual force and the two ends of the bone rubbed roughly together.

Experiment 3. The foot was charred with a Bunsen flame. No evidence of pain.

Experiment 4. The femoral artery was torn, causing great hemorrhage and necessitating the abandonment of the experiment. This accident, very likely to occur in the thin walled artery of a rabbit, is impossible, as will be shown, in the thicker walled artery of a dog or man.

Experiment 5 and 6 were in all respects similar to the preceding experiments and need not be detailed.

The disadvantage of working on rabbits is manifest, the puncture of the thin walled artery was invariably followed by hemorrhage necessitating the killing of the animal after the experiment. The perfection of the anæsthesia was determined it is true by the rabbits experiments but not its freedom from danger. Therefore another series of experiments was done on dogs and the animals allowed to live.

Experiment 7. Large black and tan dog. Under ether anæsthesia the femoral artery was exposed and c.c. of 0.5 per cent cocaine solution injected into the artery. The animal was now lifted from the dog board and allowed to recover from the anæsthesia. After fifteen minutes the dog seemed perfectly normal running about the room in the usual way. It was particularly noticed that there was an absence of any muscular paralysis. The animal was now tested for anæsthesia. The anæsthetic leg was pinched, scratched and slightly burned. No symptoms of pain were elicited. Irritation of the other leg and other parts of the body gave immediate response. After testing the anæsthesia for half an hour the wound was united with a continuous suture. During this manoeuvre the most perfect demonstration of the anæsthesia was obtained. The point of injection into the artery lay about in the middle of the wound. The lower half of the wound was sutured without any evidence of pain the animal lying perfectly quiet and seemingly unconcerned. As soon as the needle entered the skin above the point of injection the animal gave all evidences of severe pain squealing and struggling. This demonstrated that the anæsthesia extends to the point of injection. The dog was watched for a week during which no untoward symptoms were evidenced. The animal then escaped none the worse for his experience.

Experiment 8 was in every particular similar to the preceding experiment. The subject was a smaller animal and only one c.c. of 0.5 per cent cocaine solution was used.

Experiment 9 is according to present indications more of scientific interest than of practical value. The dog was large. Under ether anæsthesia the common carotid artery was exposed and two c.c. of 0.5 per cent cocaine solution injected into the artery. The wound was closed with a continuous suture and the animal allowed to recover from the anæsthesia. After about fifteen minutes recovery was complete and the animal was apparently normal. What was most interesting was the complete absence of any depression from normal intelligence. The animal ate and drank from a bowl also gave every evidence of knowing what was going on about him. The animal was now tested for anæsthesia. The results were most gratifying. There was a complete anæsthesia of the entire head face and upper part of the neck. The skull was exposed and a piece of bone chipped out. Deep incisions were made into the skin of the face ears and neck. Even the very sensitive nose and lips were scarified without causing pain. Irritation of other parts of the body elicited symptoms of pain. The bilateral anæsthesia of the face and head may be explained by the very free anastomosis between the two carotid systems. A very interesting feature of this experiment is that sight was not interfered with as shown by persistence of lid reflexes.

Experiment 10. Medium sized dog. Under ether anæsthesia the

femoral artery was exposed and 1 c.c. of 0.5 per cent novococaine solution was injected. The experiment was a failure, the leg showing no diminution of sensation.

The nature of the anæsthesia is terminal,—that is, the cocaine is carried by the capillaries to the individual nerve endings. The solution is diffused through the capillary walls into the surrounding tissues, and very little, if any, is returned through the veins to the general circulation. This is shown by the purely local character of the anæsthesia.

The following technic is to be used in man. The main artery supplying the part to be anæsthetized is exposed under infiltration anæsthesia. An Esmarch strap is now bound about the limb some distance above the point of proposed injection into the artery. The Esmarch should be used as in the Bier hyperæmic treatment, that is, snug enough to constrict the veins, but not so tight as to interfere with the arterial circulation. From 4 to 8 c.c. of 0.5 per cent cocaine in normal salt solution should be injected into the artery in the direction of the blood stream. The needle used should be as fine as possible. After anæsthesia is complete, the Esmarch may be tightened, if perfect hæmostasis is desired. At the end of the operation, the Esmarch is removed and the wound closed. The maximum dose suggested, that is, 8 c.c. of 0.5 per cent cocaine solution—contains only 0.04 of cocaine, a safe dose. This method of anæsthesia is an ideal one for certain areas of the body where general anæsthesia is contraindicated. It is particularly applicable to the upper extremity, where the brachial, radial or ulnar artery may be exposed with little difficulty. For the larger operation on the lower extremity, where general anæsthesia is contraindicated, spinal anæsthesia seems more desirable, but for the operations about the foot and ankle this anæsthesia has a distinct place. The greatest advantage of this procedure is its safety, which depends on the small quantity of dilute cocaine solution used and its probable diffusion into the tissues.

Goyanes, 1909, describes a method of arterial anæsthesia similar to Bier's venous anæsthesia, in that large quantities of solution are introduced between the two tourniquets.

ANÆSTHESIA BY COLONIC ABSORPTION OF ETHER

BY WALTER S SUTTON M D

OF KANSAS CITY MO

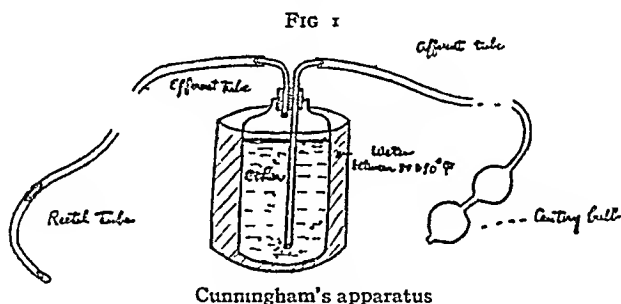
THE high efficiency of the intestinal mucous membrane of vertebrates in general as a transmitter of gases to and from the blood stream has long been recognized. As early as 1808 Erman⁷ opened the abdomen of *Cobitis fossilis* and observed that when air was swallowed the liver and the intestinal veins of the fish became bright red while when hydrogen or nitrogen was substituted the color of the organs changed to dark purple. Baumert in 1855 analyzed the gas passed per rectum by the same fish and found a marked decrease in the oxygen content and corresponding increase in nitrogen when swallowing of air had been prevented for several hours. Jobert⁸ in 1877 discovered that in *Callichthys asper* a Brazilian fish air swallowing is essential to life the fish dying in about two hours if prevented from the exercise of this form of accessory respiration. In mammals also similar phenomena have long been known. Thus Paul Bert⁹ in 1870 found that if the trachea of a kitten be clamped the animal will die of asphyxia in about 13 minutes but if the intestine be inflated with air life may be prolonged for 21 minutes. A similar absorption of oxygen by the intestinal circulation in man is indicated by the results of Tappeiner¹³ in 1886 who on analysis of gases from various portions of the alimentary canal of an executed criminal found in the stomach 9.19 per cent of oxygen in the ileum only a trace and in the colon and rectum none at all while the percentage of carbon dioxide showed a regular increase from stomach to colon.

Recognizing this activity of the intestinal mucosa the early experimentors with ether as an anæsthetic attempted its

administration by this route. Even in Pirogoff's work on etherization, published in 1847, the method is mentioned as having been used to produce complete narcosis. Since that time efforts have been made in many quarters to establish the real value of the method. In the earlier experiments ether was injected pure or carried into the bowel as a solution or as a mechanical mixture in water. Later, the pure vapor was used, being generated by placing a bottle of ether in a vessel of warm water, and forced into the bowel by the pressure incident to its formation. This latter procedure is the one which was employed in a number of the larger hospitals of our Eastern cities about 15 years ago and which resulted in the general abandonment of the method. In a number of quarters it was found that hemorrhagic discharges followed the use of ether in this manner, and at least three deaths are accredited to it.

DEVELOPMENT OF THE APPARATUS

After nearly 60 years of desultory experimentations in the hospitals of many countries, it remained for Dr John H Cunningham, Jr, of Boston, to introduce a technic which



permits administration of ether by absorption from the bowel with safety to the patient.

This technic, which Dr Cunningham has described in two papers^{5, 6}, was used by himself and his associate Dr Leahy in 43 cases with satisfaction to the operating surgeons and with no ill-effects to the patients. The salient feature of the method employed by these investigators was the use of air

of Roosevelt Hospital The apparatus used by Dr Leggett, as shown by the reproduction (Fig 2) taken from his paper⁹ on the subject, was modified from that of Cunningham by the addition of an exhaust tube *H* connecting with the efferent tube to the gut and by the introduction of U-tubes *X* and *X'* for the purpose of collecting any ether which might condense in the tubing as the vapor passed from generator to rectum This arrangement represented the "state of the art" at the beginning of the series of cases about to be described, and, with the exception of the U-tubes, which have never formed a part of our equipment, was essentially the apparatus used in our earlier cases In a number of these cases it gave entirely satisfactory results, but in others obstacles were encountered which made difficult or even prevented entirely the attainment of satisfactory surgical narcosis The study of each of these difficulties has resulted in some modification of, or addition to, the apparatus

Thus it frequently happened that semi-solid fecal matter escaping with the gas on opening the exhaust tube became lodged in the tubing and prevented the free passage of gas in either direction To prevent this, a special form of tube was made and arranged to stand between the patient's thighs close to the anus in such a position that any fluid or semi-solid matter passing in either direction would drop down into the branch of the tube leading to the exhaust Also the calibre of the entire exhaust tube was made considerably greater than that used for carrying the ether vapor to the intestine To meet the changed condition brought about by the new position of the branch tube, the rectal tube was shortened to about 8 inches in length, and since the one or two eyes of the ordinary rectal tube frequently became closed by prolapse of rectal mucosa or by the lodgement of fecal matter, tubes with from 5 to 7 eyes have been adopted Again, on account of the frequency of leakage around the rectal tube, preventing the maintenance of sufficient pressure to inflate the gut, a bulb from $\frac{3}{4}$ to 1 inch in diameter has been made on the tube at a point which in use lies just

inside the sphincter. Still another accident which at times prevented free passage of gases to and from the patient was the occasional compression by the operator or by the weight of the patient's thigh of the flexible afferent and efferent tubes*. This difficulty was met by winding the exposed portions of the tubing with stiff wire or by the substitution of tubing having a very heavy wall.

The observation that in some cases a diminution of gas pressure in the gut resulted in a deepening of the narcosis led to recognition of the fact that too great pressure produces ischæmia of the gut and a consequent interruption of absorption. To guard against this accident a mercury manometer was added to the apparatus so that the pressure of the gas in the gut might always be kept below that of the blood in the intestinal capillaries. For the more easy recognition of the escape of gas on opening the exhaust the distal end of the latter was immersed in a bottle of water placed under the operating table and to prevent confusion as to whether the gas there seen or heard to escape is coming from the gut or from the generator a combination clip was devised which necessitates the closure of the afferent tube before the efferent one can be opened.

Since as will be explained later it has sometimes been necessary to administer a certain amount of the anæsthetic by mouth as a supplement to the quantity absorbed by the intestine a tube has been provided by means of which ether vapor can be diverted from the main afferent tube and allowed to escape into the mouth or nose of the patient. Finally on account of the instability of the cylinder form of ether generator and of the more and more frequent use of oxygen as a vehicle for the ether vapor a compact metal generator has been devised which though no more efficient in maintaining narcosis than the cylinder form presents a number of advantages which will be detailed later.

* These terms are not used in the sense in which they are employed by Cunningham as afferent and efferent to the vapor generator but as afferent and efferent to the patient.

DISCUSSION OF CASES

Up to the present time I have administered ether by this method to about 140 cases on the surgical service of Roosevelt Hospital. Of this number, careful records were taken of the first 100 cases. Of the remaining 40, mostly private cases, no detailed records have been made. I may say, however, that all were satisfactory and that untoward results occurred in none. In only one case—the second of the series—was an attempt made to administer the anæsthetic per rectum from the beginning. This proved so slow and was so uncomfortable and distasteful to the patient that after about 20 minutes a cone was used to complete the initial establishment of anæsthesia. Inasmuch as there is no real indication for beginning the administration by rectum, I have never made a second attempt to do so.

Of the 100 cases in the recorded series, 91 were ward patients and 9 private patients. The age range was 2 to 77 years. The character of the operations done was as follows:

Tumors, glands, etc., of neck	31
Amputations of breast	9
Goitres and thyroglossal cysts	8
Craniotomies	6
Correction of old fractures of limbs	5
Resections, sutures and osteotomies of inferior maxilla	5
Partial excisions of tongue	4
Staphylorrhaphy	4
Tracheotomy	3
Mastoid	3
Inguinal hernia	2
Removal of parotid tumors	2
Resection and osteotomies of superior maxilla	2
Removal of Gasserian ganglion	2
Skin grafting	2
Orchidopexy	1
Hydrocele	1
Appendectomy	1
Nephrotomy	1
Ludwig's angina	1
Enucleation of eye	1
Resection of knee	1

Cervical laminectomy	1
Axillary adenitis	1
Excision of sternomastoid	1
Plastic for stricture of œsophagus	1
Laryngectomy	1
Neurorrhaphy	1

The longest operation of the series consumed 2 hours and 20 minutes the shortest 5 minutes the average time being 53 minutes

The average consumption of ether was 87 grams per hour in the 64 consecutive cases in which record of this point was kept

Twelve of the 100 cases had a preliminary injection of morphine and scopolamine

In 25 cases oxygen was used as a vehicle for the ether vapor

Forty three cases had at some time in the operation a supplementary administration by mouth of ether or chloroform

Twelve belched gas from the stomach in the course of the anæsthesia indicating a possible distention of the small intestine with regurgitation of the gas from the stomach Of these only 4 occurred in the 71 cases following the adoption of a 20 mm maximum pressure in the bowel

Only 18 cases showed any perspiration whatever and in none of these was there profuse sweating

Forty three cases vomited or regurgitated stomach contents after operation of these several disclaimed any sensation of nausea.

Twelve had abdominal pain

Five had bloody stools or blood streaked return from the post anæsthetic emenata All cleared up in from a few hours to three days and in none was the loss of blood accompanied by noticeable weakness or abdominal pain

The most severe of the cases continued to pass small quantities of blood for three days during which she also vomited persistently This case Case XXVI of the series was the last save one in which any hemorrhage (beyond the

negligible amount occasionally caused mechanically by the rectal tube) has occurred

CASE XCVII, as an incident to the introduction of a new form of ether generator, was treated to an excessively concentrated vapor, so that great care was necessary to prevent narcosis from becoming too deep. In the first three days following the operation, this patient had five bloody stools. He felt no discomfort, however, and was discharged on the fifth day in perfect general condition.

In the series of cases to date there have been 5 deaths from all causes. In none of these, in the judgment of the operating surgeon, was the method of administering the anæsthetic a contributing factor. A brief statement of the conditions in each of these cases follows.

CASE I—Large, heavy man, moderately alcoholic. Operation, partial excision of the tongue for epithelioma. Patient somewhat blue and pulse was small and rapid throughout operation. Died—apparently of operative shock about two hours after return to ward.

CASE II—Large, heavy man. Age 35. Moderately alcoholic. Operation, tracheotomy and removal of cervical glands as a preliminary to laryngectomy for carcinoma of larynx. Anæsthetic was "shallow" throughout, patient coughing and groaning frequently. Made prompt ether recovery but died two days later of pneumonia.

CASE XXV—Fairly well nourished man. Age 53. Moderately alcoholic. Operation, hemi-excision of tongue and removal of right cervical glands for epithelioma. Patient took initial anæsthetic slowly and was markedly cyanotic. Color and general condition improved after beginning of the administration per rectum. Anæsthesia was shallow throughout, patient swallowing frequently. Late in operation there was marked hemorrhage, and shortly afterward—1 hour and 35 minutes after the beginning of the operation—the patient died.

CASE XLIV—Muscular man. Age 24. Brought to hospital almost moribund with compound depressed fracture of skull. After operation lasting 35 minutes the patient left the table improved but never regained consciousness and died two days later.

Autopsy showed extensive fractures of vault and base with extensive laceration of brain and marked subdural and epidural hemorrhage. The colon was normal showing no injurious effects from the ether.

CASE XLVII.—Slender negro. Age 31. Brought to hospital in ambulance with extreme dyspnoea of sudden onset. Operation low tracheotomy done in sitting posture on account of orthopnoea. On account of this position the rectum was compressed by the weight of the upper bowel and introduction of ether vapor and oxygen into the colon was almost impossible. The operation gave little relief but ether recovery was satisfactory. Dyspnoea and cardiac weakness progressively increased and two days later the patient died. Autopsy showed a large false aneurism of the descending arch of the aorta.

One other death has occurred after administration of ether by this method in Roosevelt Hospital. This case though administered by another member of the interne staff came under my own observation both during and after the operation. The patient was a well nourished child of five years which had been anesthetized on two previous occasions for the correction of hare lip and the removal of adenoids. The operation in question was a staphylorrhaphy lasting about 50 minutes. Throughout the operation there was a noticeable difficulty in maintaining a smooth narcosis the latter being too deep and too shallow by turns. In the course of the shallow intervals a little chloroform was given several times on a sponge stick. There was no excessive loss of blood. Toward the close of the operation the patient's color became very bad and the pulse small and rapid. She was hurried to the ward stimulated and given external heat. In the course of a half hour she became restless and talkative calling for water and asking to be taken home but apparently recognizing no one about her. She did not vomit. The pulse continued rapid and small and an intravenous infusion was given with slight temporary benefit. After this she gradually relapsed again into unconsciousness and about two hours after the operation she died. Unfortunately an autopsy could not be obtained.

It is the author's belief that this method safeguarded by the improved apparatus to be described hereafter and by the use of oxygen as a vehicle for the ether vapor is one of extreme safety in the absence of definite intestinal lesions.

THE PHYSIOLOGY OF COLONIC ANÆSTHESIA

Theoretically the administration of any anæsthetic should presuppose a full knowledge of the physiological action of the drug on the part of the anæsthetist. Practically, however, in the case of pulmonary anæsthesia, this knowledge may be, and, in the vast majority of cases is, dispensed with in favor of an accurate knowledge of the symptoms of incomplete and excessive narcosis and the practical means of correcting each. This knowledge, gained by extensive observation and supervised experience in the pulmonary method of administration, is not sufficient basis for the undertaking of administration by the colonic method.

In the pulmonary method the drug is taken in by the automatic respiratory efforts of the patient, and is eliminated in the same way if pure air be only substituted for the anæsthetic mixture. No anæsthetic-containing reservoir remains to continue imparting the drug to the blood plasma. Further, as the only means of elimination of the anæsthetic is the same as the means of absorbing it, only so great an amount of the drug need be given as is necessary to produce in the general circulation the required one-fourth per cent for the narcotization of the central nervous system (cf Overton¹¹). Also, the absorbing surface of the lungs is so great and so well adapted to the purpose that a comparatively low concentration of anæsthetic vapor in the respired air is sufficient to produce the required percentage in the circulating blood.

When we turn to a consideration of the colonic method of administration we find all these conditions changed. The drug cannot be taken in by the muscular action of the patient nor can any unabsorbed excess be eliminated in that way. In case of over-deep narcosis the unabsorbed residue of the drug must be evacuated by the active intervention of the operator. There must be considered in the use of this method, the fact that the blood after leaving the intestine with its load of ether is obliged to pass through the lungs before reaching its goal.

in the central nervous system and that in so doing a considerable portion of the contained ether will be eliminated into the air. The concentration of the drug at the point of absorption therefore may not be the one fourth per cent of the pulmonary method but one fourth per cent plus the percentage necessarily lost by exhalation*. Again the absorbing surface of the colon is much smaller than that of the lungs and the arrangement of the vessels perhaps less favorable to gaseous interchange so that a higher partial pressure of the anæsthetic vapor in other words a higher concentration is required.

Each of these differences requires the intelligent attention of the anæsthetist. Since the anæsthetic mixture must be forced into the intestine we are immediately confronted with the question of the proper degree of pressure to be used in the process. Sufficient must be used to obtain moderate distention of the entire colon else the available absorbing surface will be too small. Too much pressure must not be exerted lest by over distention the vessels of the gut be flattened out, circulation impeded or abolished and absorption minimized and the ischæmic mucosa left unprotected by its normal circulation to resist the irritant effects of the ether vapor. The contention may be raised that experiments in which narcosis has been produced by the use of excessive pressure are sufficient to disprove this statement. The error in this contention arises from the fact that excessive pressure breaks down the resistance of the ileocaecal valve as observed by Leggett on dogs and that the narcosis is obtained by absorption under diminished pressure from the coils of the small intestine. The author's attention was first directed to the

In connection with this point it is important for those who make use of the colonic method of etherization to watch for symptoms of the so-called delayed ether poisoning since from the foregoing it is plain that the liver—the great sufferer in this condition—is treated to a higher concentration of ether than in the same grade of narcosis from pulmonary administration. No case of this kind has come to the author's attention, however unless the peculiar death mentioned on page 465 has some affiliation with this class of cases.

necessity for the use of a moderate pressure by the repeated observation that reduction of pressure often resulted in deepening of the narcosis

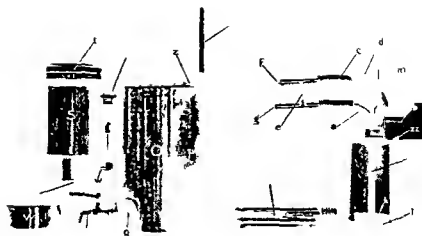
The optimum pressure to be maintained in the colon has been determined experimentally to be about 20 mm of mercury, which is approximately equal to the sum of the positive pressure in the intestinal capillaries and the negative pressure in the portal vein. This would be varied according to the blood-pressure of the patient, *i e*, should be reduced to 10 or 12 mm in young children and may be increased in individuals with abnormally high blood-pressure.^{*}

On account of the inevitable loss of ether from the blood in its passage through the lungs, it is sometimes necessary to adopt means, to be mentioned later, for keeping the respired air more or less laden with ether

For the same reason and because of the smaller and less efficient absorbing area of the colon as compared with that of the lung, a relatively high concentration of the anæsthetic mixture must be used. To meet this last requirement, a number of early investigators and unfortunately, some recent ones^{1, 10} as well, adopted the expedient of passing *pure* ether vapor into the gut under the pressure incident to its generation. This doubly dangerous procedure has resulted in a number of deaths, in one of which (reported by Professor Baum, *loc*) autopsy showed a gangrenous and perforated cæcum and general suppurative peritonitis

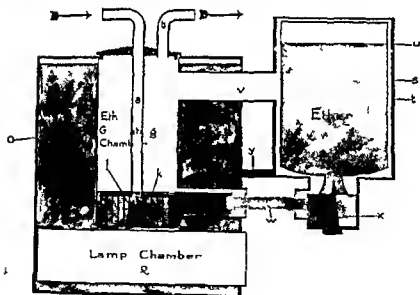
The danger of too great concentration of ether is obviated in the method used by the author by employing oxygen (or air) as a vehicle and by keeping the ether from which the vapor is derived well below its boiling point. By maintaining a uniform temperature in the ether, with a fairly constant flow of oxygen and a definite period of association of the oxygen stream with the liquid ether, a fairly constant degree of concentration may be attained

* In connection with this question it is well to have in mind the experiments of Quin,¹² in one of which a normal healthy cat having a blood-pressure of 85 mm died after 5 minutes of an intra-abdominal pressure of 10 mm



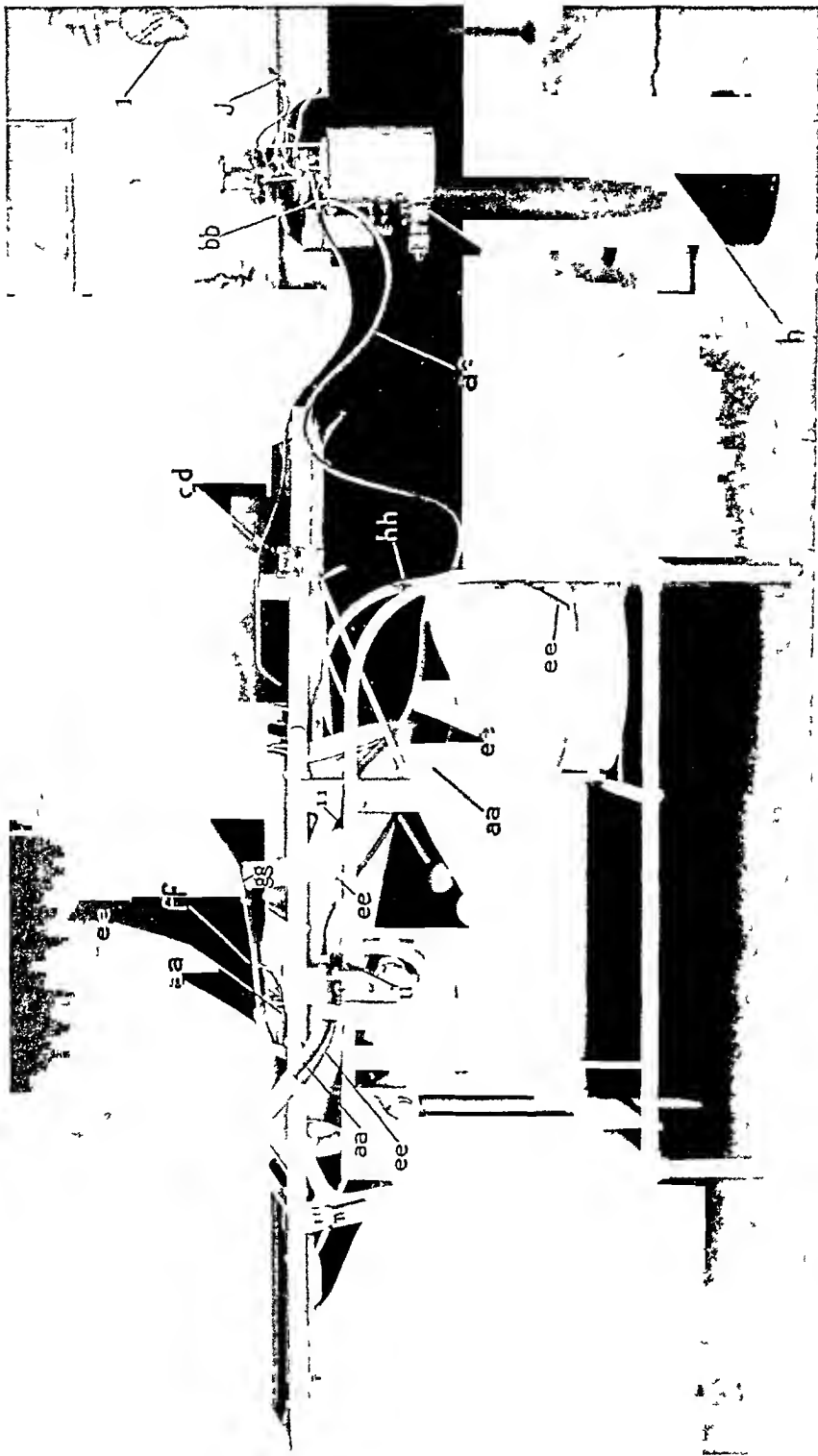
P t f po t

F 4



S h m t f po g t

g O g t w t l l t b Co ff be m n



aa Afferent tube system *bb* T tube for connecting accessory mouth tube *dd* Clip for same *ee* Effluent tube system *ff* Y tube *gg* Rectal tube
hh Combination clip on afferent and effluent tube system *i* Air bulb *j* Clip on air connection which is closed when oxygen is being used to prevent leakage
 through air bulb *zz* Sliding clips for holding tube systems on tube *ll* Oxygen tank Tell-tale bottle not shown should sit in drip pan of operating table and
 receive distal end of effluent tube

THE AUTHOR'S APPARATUS

The original apparatus in use at Roosevelt Hospital was that of Cunningham the simplest possible means of forcing air through warmed ether and carrying the mixture into the intestine—plus a branch tube used for exhausting the contents of the gut when occasion required. The latter feature introduced by Leggett is one of the valuable points in the apparatus with which this chapter is concerned.

The complete apparatus may be regarded as made up of three parts (1) a generator in which the mixture of oxygen and ether is produced (2) an afferent tube system which carries this product into the intestine and (3) an efferent tube system for the purpose of exhausting the contents of the gut.

The Generator—This portion of the apparatus consists of a small generating chamber proper surrounded by a water jacket and connected with an ether storage chamber which automatically maintains a given level of ether in the generating chamber. The arrangement and working of the various parts will be most readily understood by a glance at the photograph of the dissected apparatus (Fig. 3) and the schematic sagittal section shown in Fig. 4. Only one feature will require special description. This is the spiral wiper *l* which determines the prolonged intimate contact of the oxygen (or air) with the fluid ether. This device consists of spirally wound strip of thin brass three quarters of an inch wide and about 14 inches in length soldered to the bottom of the circular disc *k* with which the oxygen inlet tube *a* connects.

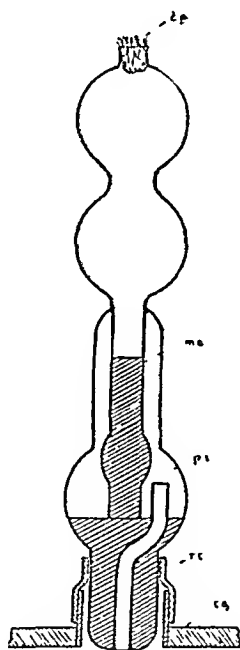
The level of the ether in the generating chamber is automatically maintained at such a height as just to cover this wiper and disc. The oxygen (or air) is admitted to the apparatus through this tube *a* some distance below the level of the ether under the plate *k* and finds its way to the surface only after traversing all the windings of the spiral. This necessitates intimate association of oxygen with ether for a distance of 14 inches and has been shown experimentally to bring about a complete saturation of the former with the latter.

The ether saturated oxygen rises into the upper part of the generating chamber and is carried by the tube *b* into the afferent tube leading to the intestine. The main body of the ether remains in the original package *t* which is inverted in the ether reservoir *s*. To charge the generator a sealed ether can (this apparatus is designed to take a Squibb's 250-Gram can) is inverted in the reservoir the seal being penetrated in the act by a flattened spike *x* which projects from the bottom of the reser-

voir A twist of the can then serves to ream out a fair-sized opening Ether then flows out into the lower part of the reservoir and into the generating chamber until it has reached a level above the perforation in the seal when, the entrance of air being interrupted, the outflow of ether ceases until the level of the fluid has been again reduced so as to allow more air to bubble up into the dome of the ether can This principle of the kerosene "student lamp" must be familiar to all my readers Before any pressure is put on the generating chamber, the cover, *u*, of the ether reservoir must be screwed on air-tight

Surrounding the generating chamber is the water-jacket, *o*, which is maintained at a temperature of 88 to 90 degrees (not higher) by the

FIG 5



Sectional view of manometer *mc* Mercury column, *pi* Pressure inlet, *cp*, Cotton plug in pressure vent *cg*, Cover of generating chamber, *rt*, Short piece of rubber tube connecting manometer with cover

10 candle power tubular incandescent electric lamp, *r*, inserted into the blind tube, *q* A thermometer, *n*, projecting from the top of the water-jacket readily shows the temperature of the contained water

A manometer, *m*, projecting from the cover, *xx*, of the generating chamber, shows at all times the pressure maintained in the generating chamber and hence in the intestine of the patient This manometer, of which an enlarged sectional drawing is shown in Fig 5, also serves the purpose of a safety valve, being so constructed that when the pressure reaches a point a few millimeters above the optimum, the oxygen-ether mixture of the generating chamber is permitted to bubble up through the mercury and escape into the air This point is of importance since

the needle valve of the oxygen tank may be accidentally opened too wide which in the absence of such a safety valve would put a dangerous pressure on the gut. When such excessive pressure has subsided the mercury falls back from the upper chamber of the manometer and the safety valve is closed.

The H tube *c* makes it possible to have at the same time means of passing either oxygen or air through the generator and also of inflating the intestine with pure oxygen or air without appreciable admixture of ether. This latter procedure is accomplished by simply opening the pressure clip *d* which allows the oxygen or air to pass into the afferent tube and on into the intestine without making its way through the generator itself. The generator may be either hung by a bracket from the oxygen tank as shown in Fig 6 or set upon a small table.

For those who wish to make their own apparatus a simpler form of generator will be found quite satisfactory. This may be made by the use of the spiral wick in any wide mouthed bottle capable of containing 250 to 400 Grams of ether with 4 or 5 inches of free space between the

FIG 7



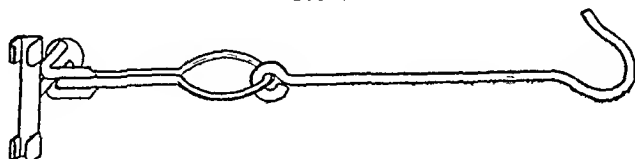
Sectional view of the Afferent and Efferent Tubes. The diagram shows a horizontal tube with a vertical section in the middle. The vertical section has a small opening on its left side. The horizontal tube continues to the right, where it has a small protrusion or connector. The diagram is a cross-section or side view of a device used for colonic absorption.

fluid and the cork. The manometer is inserted through the cork and the proper afferent connections provided. In the place of the water jacket a pail of warm water is provided and the bottle partly immersed in it. The temperature is registered by a floating thermometer and is kept up to the proper point by occasional addition of very hot water.

The Afferent and Efferent Tube Systems.—These as will appear from a glance at Fig 6 run a parallel course for the greater part of their length—the efferent or exhaust tube being led to the head of the table in order that it may be controlled by the anesthetist sitting in that situation. The afferent tube is of small calibre since it conveys only gas while the efferent tube which is frequently called upon to conduct water and semi-fluid fæces must have a much greater inside diameter. Both tubes have very thick walls in the portion which passes over the edge of the table and under the patient's thigh. This is to obviate the danger of compression in this situation. The rectal tube is a short single tube having a bulb about 3 inches from its outer end and supplied with from 5 to 7 fenestræ. This bulb in use aids to prevent leakage in case of a lax phincter while the multiple fenestræ are a safeguard against closure of the tube due to prolapsed mucosa or to

fecal particles when the exhaust tube is opened. Communication between the rectal tube on the one hand and the afferent and efferent tube system on the other is established by the use of a Y-shaped tube of glass or metal (Fig 7) which stands horizontally between the patient's thighs close to the anus. The upper straight arm connects with the afferent tube while the lower curved branch leads to the efferent connection. By reason of its position and construction this Y-tube acts as a trap to catch either

FIG 8

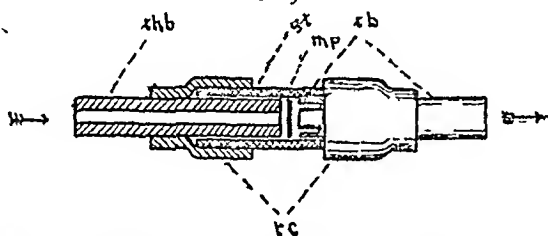


Combination clip with hook

condensed ether from the afferent tube or fluid or semi-fluid matter coming from the rectal tube when the exhaust is opened.

A strong glass tube is introduced into the efferent system as shown at *ee*, Fig 6. This serves the double purpose of preventing a sag in the exhaust tube at this point and of furnishing a rigid support for the sliding hooks *u*, which form the principal means of attaching the apparatus to the table. The end of the efferent or exhaust tube is immersed in a few inches of water in the bottom of a wide-mouthed bottle which sits either on the floor under the head of the table or in the drip-pan connected with the latter. This bottle serves both as a collector of any

FIG 9



Check-valve used in afferent tube when coughing is to be permitted (partial sectional view) *thb*, Thick walled brass tube connecting with generator, *tb*, Thin walled brass tube notched on end toward valve connecting with main afferent tube, *gt*, Glass tube surrounding valve hamper, *mp*, Mica-plate valve, *rc*, Cuffs of rubber tubing connecting glass and brass tubes.

fluid return from the intestine and as a "tell-tale," since the amount of gaseous return following the opening of the exhaust is readily appreciated when it is seen or heard bubbling through the water. Continuous leakage from the exhaust is prevented by a spring-clip, *hh*, which I have modified as shown in Fig 8, so that the afferent tube is held in relation with one of the finger-rests of the clip. This relation of clip and afferent tube insures the closure of the latter by the same finger pressure which opens the former. Gas is thus prevented from entering the intestine as long as the exhaust is open. For the sake of keeping it in a definite

position this combination clip is attached to the table by a long wire hook. Since in some cases it is necessary temporarily to supplement the colonic administration by the addition of ether by mouth a T tube *bb* Fig 6 is placed in the efferent system close to the generator and a small rubber tube led off and closed by a spring clip.

In mouth and throat cases where it is desirable for the patient to retain an active coughing reflex it has proved of advantage to introduce a small mica plate check valve beyond the origin of the accessory mouth tube. Coughing produces a very marked increase in intra abdominal pressure and in some cases before the introduction of this valve a paroxysm of coughing has resulted in the diving of fecal stained fluid back into the generating chamber. With the check valve as shown in Fig 9 this cannot occur. When violent coughing is permitted it is necessary to open the exhaust during each paroxysm lest the rectal tube be extruded by the effort or an automatic safety valve may be arranged by leaving off the exhaust clip and immersing the weighted end of the exhaust tube in about 18 inches of water. This height of water will be sufficient to prevent escape of gas at 20 mm pressure but readily permits escape at the higher pressure incident to coughing. When this device is used the intestine may be emptied of gas by simply raising the end of the exhaust tube to the surface of the water.

TECHNIC OF METHOD

Preparation of the Patient—As observed by all workers with intestinal anæsthesia one of the most important considerations is thorough cleansing of the colon. This is accomplished by a cathartic of castor oil given the night preceding the operation and following in the morning by high soap-suds enemata repeated until the return is clear. In the author's cases three enemata $1\frac{1}{2}$ to 2 hours apart have been regarded as the minimum number. In alcoholic and very muscular subjects and in operations on the mouth or upper respiratory tract it has been found useful to give $\frac{1}{8}$ to $\frac{1}{4}$ gr of morphine and $\frac{1}{100}$ to $\frac{1}{1000}$ gr of scopolamine hypodermatically 1 hour before operation.

The Administration—Before the patient is brought to the etherizing room the anæsthetist affixes the apparatus to the table as shown in Fig 6 except that the rectal tube is not attached and the Y tube and its connections are allowed to hang down at the side of the table while the accessory mouth tube is permitted to hang from the side of the generator. The ether reservoir is charged if it does not already

contain ether left from a previous case, the water-jacket filled with water at about 90 degrees and the electric lamp connected with a plug in the wall, *but not lighted at this time*. The end of the exhaust tube is placed in the "tell-tale" bottle under the table.

The anæsthetic is then started by the pulmonary method and carried to a stage of partial relaxation when the patient is brought to the operating room and placed on the table. The rectal tube—well greased, is then quickly inserted until the bulb lies just inside the sphincter, the anæsthetist before starting the initial anæsthetic having protected his left hand with a rubber glove for this purpose. The patient's left thigh is then raised and the branch tube brought under in to its proper position and connected with the rectal tube. For this brief period, the cone has been held over the patient's face by a nurse. The anæsthetist then removes his rubber glove, takes his place at the patient's head and slowly turns on the oxygen. As soon as this is done the cone may be removed from the patient's face. If the operation does not involve the patient's mouth, it is best to cover the latter and, if possible, the nose as well, with 3 or 4 large sterile towels, which by causing a certain amount of rebreathing, impede the elimination of ether from the lungs. If during the change from the pulmonary to the colonic method, the patient has "come out" and begun to make troublesome voluntary movement, he can be quickly "put under" by admitting ether vapor to the space under the towels through the accessory mouth tube.

As soon as pressure in the colon has been raised to the required 20 mm the exhaust should be opened and the gut allowed to empty itself. This process of filling and emptying the intestine should be repeated three or four times in order to eliminate as thoroughly as possible the natural gases of the bowel. The needle valve of the oxygen tank is then set at a point which just maintains the required 20 mm pressure and usually demands little or no further adjustment during the rest of the operation. If the patient tends to come out from the influence of the anæsthetic the bowel may be

emptied from time to time to carry out any intestinal gases which tend to dilute the anæsthetic mixture. If on the other hand the anæsthesia continues sufficiently deep no further use of the exhaust need be made until the end of the operation. This is because the oxygen is absorbed by the bowel with the same rapidity and ease as the ether vapor so that no residue remains.

When air is used as a vehicle the bowel must usually be emptied every 5 or 10 minutes as in this case a nitrogen residue tends to accumulate and act as a diluent of the freshly added anæsthetic mixture. Whenever possible oxygen should be used as a vehicle in place of air—first because it reduces the dangers of anæsthesia secondly because it greatly diminishes the rapidity and depth of respiration in some cases even causing the phenomenon of apnoea of hyperoxygenation thus greatly reducing the loss of ether through the lungs and thirdly because of its obviating the necessity of frequent use of the exhaust and hence contributing to the smoothness of the anæsthesia and the comfort of the anæsthetist. It was not possible in our cases to estimate exactly the amount of oxygen consumed as the same tank was used for other purposes but the quantity was surprisingly small—the cost reaching something like 10 or 15 cents per hour.

In the ordinary case a smooth anæsthesia continues from this point with little further active intervention on the part of the anæsthetist. The needle valve of the oxygen tank may require occasional adjustment and the thermometer must be watched to see that the temperature of the water bath does not become too high. When the temperature tends to rise above 90 degrees the incandescent lamp may be partly withdrawn from the water bath or it may be turned off for a few minutes being lighted when the mercury has fallen to 88 or 89 degrees. If with a lighted 10 candle power lamp inserted the full length into the water jacket a temperature of 90 degrees cannot be maintained it is certain that there is a leak in the apparatus or from the patient's sphincter necessitating an excessive flow of oxygen to maintain the required pressure.

and hence an excessive evaporation of ether with its accompanying increase in refrigeration

Too shallow narcosis is met by adjusting the face towels so as to cause increased rebreathing of the exhaled ether (this does not cause cyanosis on account of the constant absorption of oxygen from the bowel), and, if this is not sufficient, by introducing anæsthetic mixture under the towel from the accessory mouth tube

Too deep narcosis is met by temporarily shutting off the stream of oxygen and allowing the exhaust to remain open for a short time, or by markedly reducing the pressure without opening the exhaust

The depth of narcosis is determined by the pupils, which are usually at maximum contraction in complete anæsthesia by this method (if morphine and scopolamine have not been administered when of course they have little value), by the degree of muscular relaxation, and by the color which may be noted from the lips and face but better from the color of the blood in the wound. The character of the respiration is of less value, as the patient may have excellent color though breathing very infrequently. Short, shallow, jerky respiration, especially when associated with a dusky color, is a danger sign, as in the pulmonary method

I rarely take the pulse except in cases which are manifestly doing badly or where cardiac complications are known or suspected. Muscular tone is best determined from the tension of the jaw muscles and from the presence of voluntary movement of the tongue. It is the author's habit in using this method to keep one finger in the patient's mouth to detect the first active tightening of the jaw or voluntary movement of the tongue. Sufficient ether need not be given to make the lower jaw entirely relax but merely enough to prevent actual biting of the finger. Difficulty in breathing is readily overcome by extending the head on the neck by simply pulling with the finger upon the upper incisors. This has always been sufficient, so that in the entire series of cases here reported neither mouth-gag or tongue forceps have been used to improve the respiration of the patient

At the end of the operation the bowel is filled with oxygen to a pressure of 20 mm and emptied several times these oxygen enemata serving to carry off the greater part of the unabsorbed ether. Occasionally it seems advisable to massage the abdomen in the direction of the colon before removing the rectal tube but this is usually unnecessary. The rectal tube is then withdrawn and disconnected from the Y tube.

After Treatment—As soon as the patient is returned to bed a high soap suds enema is given being siphoned off after a few minutes if necessary. A half hour later a second treatment of the same sort is given. Recovery is rapid and vomiting usually absent. When present it is very rarely severe and not a few of those patients who do vomit curiously enough disclaim any feeling of nausea.

To prevent any possibility of transmission of typhoid amœbic colitis or other intestinal infection from one patient to another the rectal tube and the Y tube are kept between cases in a 1 per cent solution of formalin. The glass tip of the accessory mouth tube is kept when not in use in the same solution.

CONCLUSIONS

From what has preceded it is evident that the colonic method of administration of ether is more complex than the pulmonary method in general and requires from the anæsthetist a broader appreciation of the physiological factors involved. For these reasons alone its field of usefulness is limited to cases in which it presents distinct advantage over the pulmonary method. It is therefore not a method adapted to the experimental use of the tyro but rather a valuable addition to the armamentarium of the trained anæsthetist.

We may summarize the indications and contraindications as follows.

Indications—(1) Operations upon or about the respiratory tract (head neck and chest) especially such as lay open the mouth larynx pharynx and trachea.

2 Operations upon patients in whom ether absorption must be minimized on account of lung, heart or kidney lesions

3 Operations upon cases already suffering from respiratory embarrassment

Contraindications — (1) Operations upon cases presenting lesions of the alimentary tract, especially such as might cause weakness of the wall of the colon

2 Laparotomies in general, except such as do not open the general peritoneal cavity, *e g*, suprapubic cystotomy This because of the interference of the inflated colon with the work of the surgeon

3 Operating upon cases with markedly incompetent sphincter or with large complete fistula in ano A patient with an open appendicostomy would offer the same difficulty of leakage

4 Operations upon cases suffering with orthopnoea In these cases it is usually impossible to inflate the colon because of the obstruction caused by the weight of the other viscera resting upon it

5 In emergency cases in general because of the lack of preparation of the colon

The points in favor of the method in cases in which its use is indicated may be summed up as follows

1 Freedom of operative field from contamination by the anæsthetist

2 Ability to maintain a smooth and continuous anæsthesia in operations involving the respiratory tract, thus shortening the time and reducing the shock of operation

3 Uniform depth of anæsthesia, causing light narcosis and a marked saving in ether

4 Lessening of pharyngeal and bronchial secretion and of tonic contraction or troublesome relaxation of jaw muscles

5 Ability to administer oxygen without interruption of anæsthesia

6 Minimized loss of heat during operation because of diminished sweating and ether refrigeration

7 Reduction of postoperative vomiting and nausea

The only point against the method in cases where its employment is indicated is the occasional difficulty in maintaining profound anæsthesia without the use of the supplementary mouth tube

In justice to myself I am forced to disclaim responsibility for the premature appearance of some of the figures herewith given and of a partial description of my apparatus which appeared in a recent article on the subject of rectal anæsthesia⁴ The photographs and letters which formed the basis of the article in question were furnished the author solely to assist him in his use of the method and their publication was without my knowledge or consent

It is a pleasure to acknowledge my indebtedness to Drs Jos A Blake and Geo E Brewer on whose services in Roosevelt Hospital this work was done for their hearty encouragement and assistance

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PUS IN THE ABDOMINAL CAVITY

BY JOHN B. DEEVER, M.D.,

OF PHILADELPHIA,

Surgeon in Chief to the German Hospital

THE last three decades have cleared up the rôle of bacteria in pus production, and pathologic physiology has taught us much concerning its meaning. Surgery has turned a flood of light upon the avenues of intraperitoneal infection, and, armed with a knowledge of its principles, has been making an increasingly successful fight against it. Still, infection and its sequel, pus formation within the abdominal cavity, constitutes one of the chief dangers to life and consequently one of the chief problems of surgery.

Pus in the abdominal cavity may be either free or circumscribed. That it may become confined is due to the adhesive powers of inflamed peritoneal surfaces. In general, circumscribed collections of pus are less dangerous to life than an unconfined suppurative process. Collections in the lower part of the abdomen are less serious than those in the upper portion. Abscesses situated at the margins of the cavity afford a better prognosis than those located centrally, and those which abut upon the wall through which discharge may be effected, than those which lie between loops of bowel, folds of mesentery, or in recesses behind the viscera.

Wherever it be, however, a definite collection of pus within the abdomen requires surgical aid, except in the rarest instances. "Ubi pus ibi evacuo" is as true to-day as it was when it was coined in the days before the pathogenesis of pus was understood. The practical problems, therefore, resolve themselves into two, namely, the time of attack, and the method of approach.

The chief sites of circumscribed pus are in the lower

* Read before the Philadelphia Academy of Surgery, December 6, 1909

abdomen the right iliac fossa and the pelvis in the upper abdomen between the diaphragm and the subjacent viscera below the right lobe of the liver in the so-called subhepatic space and in the peripyloric region both anteriorly in the general peritoneal cavity and posteriorly in the lesser sac These sites correspond in general to the great sources of intra peritoneal infection the appendix the internal genitalia of the female the gall bladder and the pyloric region of the alimentary tract Usually therefore the location of an abscess points to its origin

There is however considerable variability from the type of abscess derived from each of these sources secondary collections may form elsewhere and less frequent conditions such as diverticulitis perforation of benign or malignant ulcers of the intestine suppurating mesenteric glands acute pancreatitis and a host of other conditions may on occasion give rise to abscess formation so that no region of the abdomen is entirely immune

An appendiceal abscess should be attacked as soon as its presence is determined providing the patient's condition warrants any operative risk The form which is most amenable to treatment is that which lies external to the cecum in the flank A simple incision into the abscess will evacuate the pus and provide free drainage The cavity should not be irrigated nor should the wall be roughly wiped free of pus Nature has already thrown about the cavity a protective wall of embryonic connective tissue which will do its own work of cleansing and will secrete antibacterial serum for the extermination of the micro-organisms while granulation will start at once when pressure is relieved Let the delicate granulations alone A cautious search for the appendix may be made and if it be found in the wall of the abscess cavity it is proper to remove it In my opinion it is inadvisable to insist upon finding the appendix if thereby it is necessary to do extensive damage to the confining adhesions or to open the looser post peritoneal tissues Recurrence will occasionally happen when the appendix is not removed but in my opinion the immediate indica

tion is the urgent one,—and that indication assuredly is to get the patient well from his present attack, accepting no unnecessary chances. Nature has already excluded the appendix and it is no time to do preventive surgery in the presence of infection and toxæmia. Loose gauze packing is advantageous, not as drainage but to keep the cavity and incision open so that drainage may occur. Care should be taken not to obstruct the free drainage with tightly packed and sodden gauze, misnamed drainage. This is the course which has given me the best results, where the incision may be made through the parietes directly into the abscess.

Where the abscess does not abut in this manner upon the accessible abdominal wall, as in collections beneath the mesentery, between coils of intestine, below the liver, or retrocæcal, it is necessary to open freely into the abdominal cavity. Then, cautiously exploring the limits of the abscess, gauze pads should be packed about it to push the unaffected bowel away and to protect it from soiling. The abscess may then be opened and the pus aspirated or gently mopped away.

In such a case I make a special effort to locate and remove the source of infection. Nature had excluded it from the general cavity, but we have annulled her work and placed it once more in communication. We must therefore, if possible, provide against a recrudescence under conditions once more favorable to generalization. Having accomplished this much we must provide a tract for the discharge of necrotic and infectious material from the site of the abscess and the isolation of that tract from the general cavity. This we do by tubular drainage of rubber or glass, or other material, if the abscess cavity be distant from the surface where discharge is to take place, as in pelvic abscess or abscess located below the liver, or in the enteronic area. It may be advisable to bring such drains out through a stab in the loin or suprapubic portion. Isolation of the tract we effect by making use of the power of gauze to excite adhesions. Some soiling of clean peritoneal surface must occur in such manœuvres. But the peritoneum is no longer regarded as it once was, as the most

vulnerable structure of the body. It is the good friend of both surgeon and patient and with the aid of the immune forces of the body already rallied against the infection it can take care of itself providing the original focus is not able to direct an attack against it. We do not presume however on this defensive power of the peritoneum but aim to soil as little clean surface as possible.

Like loin abscesses collections of pus in the pelvis may at times be advantageously opened extraperitoneally by way of the vagina. These abscesses arise usually from tubal disease. When acute or subacute if we have reason to believe that the pus contained is still infective this is a safer procedure than to attack the collection from above. This is distinctly a palliative operation and will usually require abdominal section at a later date. Therefore when the process is of considerable duration and we have reason to believe that the pus is sterile or of low virulence it is best to make a laparotomy in order to attend at the same time to such organs as are diseased beyond hope of repair.

Subdiaphragmatic abscess affords special difficulties both of recognition and treatment. In view of Dr Jopson's more extended paper upon this subject to night it is unnecessary for me to do more than mention it.

Abscesses in the pyloric region if in the greater sac must be attacked anteriorly and our drainage arranged so as to give the most efficient and direct outlet at the same time disturbing normal relations as little as possible. In the disposal of all drainage we must give consideration to the position of the intestines avoiding such tortuous paths as will conduce to kinks and secondary obstruction. We should also when ever possible make use of the force of gravity to carry off the secretions—in other words secure dependent drainage. This is often impossible and we must be content with relieving tension and providing a free outlet by far the most important indications.

Owing to the difficulty of localization before incision it will sometimes happen that after opening the abdomen we will find our collection within the lesser sac. In such cases it is

usually wise to close the anterior wound and make our avenue of discharge through the flank. This holds true also for peripancreatic suppuration due to suppurative or gangrenous pancreatitis.

In these cases the pus is really post-peritoneal, though it may simulate, by its forward bulging, an intraperitoneal tumor or abscess. I have several times encountered the condition, and have had no cause to regret my choice of posterior drainage, though it involved another incision. In one remarkable case, about a year ago, the entire body and tail of the pancreas, completely gangrenous, was spontaneously discharged twelve days after operation, and the patient made a good recovery.

By slight appropriate variations of these principles any abscess in the abdominal cavity may be attacked with good hope of success. In certain cases one will find more or less reparative surgery indicated. A perforating ulcer must be closed, or perchance resected. Malignant masses may require removal. These possibilities are too numerous to be foretold or here discussed. The largest measure of interest attaches to those cases in which the pus is not confined, but exists free within the abdominal cavity. At the outset of infection there is practically always some free pus formation in the immediate vicinity. This is a defensive process of Nature. To fulfil its purpose in an ideal manner, it must speedily accomplish the destruction of invading micro-organisms and again undergo absorption. This frequently occurs. How often we are met with a thin turbid fluid, seropus, when we open the peritoneum in search of an inflammatory condition! A culture may, or may not, be positive for micro-organisms. If not, it was formerly explained on the grounds of a chemical peritonitis, but we now know that failure to find organisms indicates that they have been destroyed, absorbed, or entangled in the fibrinous mesh upon the surface of the intestines.

If the infecting organisms be of high virulence, or in too great dosage, whether by sudden escape of large quantities of infective material or by reason of a slower but continuous outpouring of renewed infection, or if the bodily resistance

be inadequate the defense is overpowered exudation continues the slain and useless phagocytes accumulate the fluid deprived of its antitoxic and antibacterial properties becomes at once a culture medium for their multiplication and a means for their transference to fresh fields The powerful toxic emanations of the bacteria held in solution in the liquor puris make it a poisonous foreign material locally injurious and by absorption dangerous to the delicate parenchyma of the essential organs Thus we are hoist with our own petard

Of all single factors which influence the outcome of such a case that of time is the most important It is true that there are cases of infection of the peritoneum which at the present time seem to be uninfluenced by surgical treatment at any stage These are usually due to the streptococcus and cause little pus formation but an intense inflammation and paralysis of the intestines with rapid fatal toxæmia No known surgical measures seem to change materially the course of such an infection Thus Barker in the last Address in Surgery before the British Medical Association was led to remark

When we speak now of peritonitis we are conscious that we are using a term which includes conditions as widely apart as an ordinary attack of eczema and a desperate cutaneous streptococcal erysipelas In these cases I doubt whether the mechanical aids of surgery will ever be sufficient to avert a fatality and I look for help rather to some method of inducing active or passive immunity to the micro organism

Fortunately these extreme cases are comparatively rare The vast majority will yield promptly to operative treatment provided it be done sufficiently early In my experience the prognosis of peritonitis depends not so much upon the type of infection as upon the duration of the disease before treatment is instituted Late peritonitis is quite a different disease from early peritonitis I may illustrate this from my own experience by a series of cases which I have had compiled recently In 70 consecutive cases of diffuse peritonitis secondary to perforative or gangrenous appendicitis or ruptured gastric or duodenal ulcer which were operated upon within forty

hours after onset, there was but one death, a mortality of 1.4 per cent. Of 99 cases operated within the first fifty hours, three died, a mortality of 3 per cent. This gives an idea of the rapidity with which the mortality mounts as a result of delay in this class of cases. As a further illustration I may say that in the last consecutive 55 cases which I have found suffering with generalizing or generalized peritonitis, there have been 11 deaths, a mortality of 20 per cent. A number of these cases were in extremis when admitted, and I confess that I know of no way to save the neglected cases. I resent the fact that these deaths are charged to surgery when the blame really rests upon the cause of delay, whether that be due to circumstances, to the patient himself or, as in too many instances, to bad advice.

While we are busied with improvements in technic, therefore, let us not forget to sound the note against delay, the most important single cause of mortality.

As a corollary to the importance of early operation is the fact that the most important single object of operative intervention is the treatment of the focus of infection itself. Appropriate treatment of this source will often be sufficient in itself to allow nature to complete the cure. There are, however, many subordinate aids in treatment which are of great value, among which I would mention the importance of quiet, the Fowler position, light careful anæsthesia, quick, skilful operation, saline infusion hypodermically, intravenously and particularly by way of the rectum as introduced by Murphy, and careful after treatment, usually consisting in a "masterly inactivity." The scope of this paper, however, precludes more than passing mention of all these and necessitates close adherence to the subject.

What is to be our attitude towards the pus already present within the abdominal cavity? It is but a few years since the peritoneum was considered one of the most vulnerable tissues of the body. Surgeons were horrified at the discovery of pus within the abdomen, and with little faith in nature they devised methods of treatment consonant with their belief that

the recovery of the patient was possible only through their ingenuity in getting rid of the pus. So we find that patients had their bellies washed out with antiseptic solutions the intestines vigorously scrubbed with gauze and some surgeons more ingenious than clear sighted devised means for constant irrigation of the abdominal cavity. These measures were supplemented by cumbrous methods of drainage both with gauze and tubes. These attempts at plumbing not only failed signally to perform the function for which they were devised but gave rise to complications due to their presence. On the other hand it was observed that the peritoneum of itself possessed wonderful resisting and recuperative powers. More and more was entrusted to nature and even to-day we have not found the limit. I am certain that I drain less and less every year. Where I once said "When in doubt drain" I am now likely to say "When in doubt don't drain." I do not hesitate to close up any case which shows only a small amount of seropurulent fluid within the abdomen. Often the culture from such an exudate will be sterile indicating that the infection is already overpowered. But even when micro organisms are demonstrated it makes no apparent difference in the ease of recovery.

Thick vicious looking pus in considerable amount especially if it be foul smelling is in my mind still an indication for drainage. I waver somewhat even in certain of these cases and I have closed a few of them without ill effect. I believe that we will find it unnecessary to drain many of these cases if the source of infection can be rendered innocuous. I believe this to be true both because of the clinical evidence of having seen such cases *get well without drainage* and because I am skeptical of the degree of general drainage of the abdominal cavity that may be obtained by practical methods. I have pointed out that the earlier attempts at extensive sewage systems resulted in failure. Now when we limit the amount of drainage we get hardly more than a local effect. It is a fatuous hope to drain the abdominal cavity by introducing a tube into the pelvis or indeed into any other region of the

abdomen In my opinion we are still much misled by the idea of drainage as applied to the abdominal cavity Any foreign body within the peritoneum speedily excites adhesions which cut it off from the general cavity Especially is this true when the peritoneal surfaces are already inflamed The function of any sort of drainage placed among the intestines rapidly becomes purely local For a few hours it may serve to a limited extent as a general avenue of discharge, but this soon ceases and the discharge becomes usually thin and watery, being nothing more than an exudation from the walls of the drainage tract I have not infrequently seen such drainage from a tube when there was a large amount of unconfined pus in other areas of the abdomen This fact also has a bearing upon the ideas in regard to the relief of tension, almost a cant phrase nowadays In desperate cases it is not so uncommon to find a high degree of tension with accumulation of pus in spite of tubes introduced within the abdomen Thus, when the surgeon is cajoling himself with such ideas of scientific assistance he may be doing very little to affect the result These facts confirm me in my belief in little drainage, skillfully placed and quickly removed, as its effect becomes local rather than general

Another misleading term is drainage as applied to gauze, the true use of which is to isolate necrotic areas or dangerous foci of infection from the general cavity and establish a tract opening upon the outer world When used as drainage it more often defeats its purpose than it accomplishes it Sodden, pus-soaked gauze is an obstacle to the flow of secretion instead of a conductor As I remarked long ago, a cigarette drain is an excellent thing when there is nothing to drain

In the treatment of free pus within the abdominal cavity, then, we are obliged to rely very largely upon the powers of the peritoneum to care for itself We may aid by the evacuation of an excess of pus at the time of operation, and by means of drainage we may secure a sustained effect for some hours This is undoubtedly very important for many cases and should be done, but in many others it is not essential, and in those

which are benefited we often aid nature but little in the disposal of pus and infection already present

The advisability of washing away the exudate at the time of operation is of course another point to be considered here

I am aware that free general irrigation local irrigation wet sponging dry sponging and no irrigation all have their strong adherents well fortified with opinions and statistics I feel however that any strenuous measures directed towards removal of exudate already present are but an expression of the old tendency to do too much and rely too little on nature While Blake and some others have reported excellent statistics obtained under the irrigation treatment I am convinced in looking over the statistics reported by many workers that those who do not irrigate get the best results I have been better satisfied since I abandoned it some years ago My objections to irrigation in brief are that

1 It consumes time that we cannot afford to lose

2 It diffuses infectious material a serious matter in generalizing peritonitis where there may be extensive areas of peritoneum as yet unaffected

3 By causing us to manipulate the bowels it has a tendency to promote paresis

4 My own experience and I believe the combined experience of operators all over the world show a higher percentage of cures without irrigation

I do believe it to be good practice to aspirate any collection of fluid in the pelvis or elsewhere that is accessible or to absorb gently with gauze any highly foul or purulent exudates about the source of infection but to wash extensively or to go on any extended tour of the abdomen seeking for exudate to clear away I believe is wrong

One other suggestion I have observed in certain desperate cases with large amounts of vicious pus in the cavity that a long incision partially approximated and overlain with gauze to retain the intestines permits a marked escape of exudate and seems to relieve abdominal tension in a far more satisfactory way than a single tube or multiple tubes brought out through an angle of the incision

THE TREATMENT OF DIFFUSE PROGRESSIVE FREE PERITONITIS

A STUDY OF SIX HUNDRED AND NINE CASES

BY ARPAD G GERSTER, M D,
OF NEW YORK,

Surgeon to the First Surgical Division of Mount Sinai Hospital

IT is well known that in the vast majority of cases peritonitis is due to inflammatory processes of the appendix vermiformis. During the past nine years and six months,—that is, within the period beginning May 1, 1899, and ending December 1, 1908,—six hundred and nine (609) cases of free progressive peritonitis were admitted to the two surgical divisions of Mount Sinai Hospital. Of these, four hundred and sixty-one (461) were caused by appendicitis, while only one hundred and forty-eight (148) were due to injuries and affections of other viscera. Thus we see that peritonitis followed the affections of the appendix more than three times oftener than all other causes.

For the study of the relative value of the various methods of surgical treatment employed in peritonitis, the form caused by appendicitis offers the most favorable conditions. There is in appendicular peritonitis, both as regards the locality and the sequence of the phases of the morbid process, a greater uniformity than in any of the other forms of the disorder. Premonitory symptoms of peritonitis are usually present for some time and are easily recognized in the manifestations of appendicitis. The field of the onset of the trouble,—usually the right iliac fossa,—is by laparotomy very accessible to inspection, and to the surgeon both the causation and the degree of the process are early ascertainable. Hence, for the study of peritonitis no region is more suitable than the right iliac fossa.

Within the period mentioned above, there were observed

in the first and second surgical* divisions of Mount Sinai Hospital New York City altogether three thousand one hundred and forty four (3144) cases of appendicitis. Of these more than one half—that is one thousand eight hundred and sixty six (1886) cases were complicated by various forms of intraperitoneal suppuration. Of these again a little more than one quarter—that is four hundred and sixty-one (461)—presented the features of a progressive free peritonitis. By comparing the sum of all the cases of appendicitis with the sum of those of free progressive peritonitis we find the proportion of the latter very high that is we encounter this dangerous condition about seventeen times in one hundred cases of appendicitis.

Diagnosis—Before entering upon a further analysis of the figures just presented it is necessary to define as precisely as possible our meaning of the term *progressive free peritonitis*. In examining the literature of the subject we find a remarkable divergence in the estimation of the morbid value or dignity of the term peritonitis. This shows itself in the statistical results reported. Some authors have lost an appalling number of their patients others have saved an astonishingly large proportion. The question seems to be pertinent *Is not this difference due to a divergence in the conception of the value of the term?*

The subject of defining and classifying the various forms of peritonitis and their significance is surrounded by great difficulty. Naturally the preponderant factors in diagnosis

* Each of the two surgical divisions of Mount Sinai Hospital contains about 65 beds. In the division (d) of Dr. Howard Lillenthal who kindly placed his material at my disposal for the purposes of this paper the operative work was done by himself and by two adjunct surgeons Drs. Charles A. Elsberg and Joseph Wiener. In the author's division (1st) the operations were done by Dr. Gerster and by Drs. A. V. Moschcowitz and A. A. Berg adjunct surgeons. As to the improvement of our results much credit is due to the adjunct surgeons who by their promptness with which newly admitted cases were attended to at all hours of the day but especially in the night time were undoubtedly instrumental in saving an increasing number of lives that would certainly have been lost under a procrastinating management.

and classification have been anatomical. But each of the anatomical factors, taken by itself, is inadequate to give a true conception of the dignity of the process in question. Recognition of the bacterial element of causation has widened and deepened our comprehension, but a too one-sided reliance upon its value is also apt to lead to error. Finally, we have begun to search into the physiological side of the matter, by studying the ways in which the unaided organism tries, and often succeeds, in eliminating dangers due to infection. The vague term, "the powers of resistance of the individual," is beginning to take shape, and the comprehension of its full meaning will greatly aid us in understanding the divergent issues of a seemingly identical process.

It is not necessary, before this assembly of distinguished surgeons, to enter into the demonstration of the fact that not one of the clinical, nor any one of the anatomical or bacteriological factors, *alone*, can give us a true and valid conception of the morbid dignity of a given case of peritonitis. Those who have opportunity to see many of these cases, know the protean forms under which peritonitis presents itself to the clinician. One or more of the clinical symptoms of the disease may be absent for a long time, and reliance upon the gross anatomical elements, such as injection of the serosa, distention of the gut, fibrinous deposits, the quantity of the effusion,—its clearness, turbidity, or purulency,—the presence or absence of adhesions, are each and all of no fixed value. *The amount of danger to the life of the patient, and this alone, constitutes the salient point of the matter.*

As none of the single factors that compose a given case of peritonitis has a constant and absolute value, the accuracy of any form of classification based on one or other of them must necessarily be faulty. Its value is not absolute, is only relative, approximative,—hence, must be accepted with caution and reserve. The estimation of the prognostic significance of the symptoms of a case of peritonitis must be based not only on ascertainable facts, but on the general impression that the sick individual conveys to the observer. This again

brings into play the personal equation of the diagnostician not only his technical skill in diagnosis but that acuity of perception—the *art* in short,—which is not convertible into precise terms. If we now consider temporary or permanent bias caused by disposition or indisposition added to the shifting and insecure basis of premises of fluctuant value we shall on the one hand comprehend the pessimistic extreme of Senn who would not admit the term of diffuse or as the term then went of general peritonitis unless the diagnosis was sealed by death on the other hand we shall learn to accept ‘*cum grano salis*’ the glibness of the sanguine surgeon who unhesitatingly dubs every case of free peritonitis as diffuse and spreading registering after his operations a remarkable quota of cures. Yet to be just it cannot be denied that at a certain early stage of its development almost every perforative peritonitis is free and progressive.

But admitting that the single criteria of the significance of a case of peritonitis are all of relative value only we must nevertheless recognize that in determining danger to life some of these possess more weight than others. First among them is the quantity of infectious material that is pouring out into the healthy peritoneal sac either at one single time or continuously and without interruption. A pinhole perforation for instance has a different meaning from a large defect caused by gangrene wherefrom during an access of diarrhoea there issues a continuous stream of liquid highly virulent fæces. Of equal perniciousness are the sequelæ of the rupture of adhesions that have confined a large intra peritoneal abscess. The infection here is not single and sparse but is continuous and as to quantity copious.

Another factor of great importance the early determination of which should spur the surgeon to immediate interference is a high rate of leucocytosis. But as the most significant index of the virulence of the infection may be accepted the result of the differential count. Intense virulence is indicated by the increase of the relative number of polymuclear cells which may be present with a moderate degree of leucocy

toxis (Sondein, *Am Journ of Medical Sciences*, 1906, p 889, and Albrecht, *Zeitschr für Geb und Gynaec*, 1907, Bd 61, Heft 1)

Bacterial activity and virulence being at their greatest height in the appendicular region of the intestine, infections from there demand the promptest attention. Of the various bacterial forms concerned in producing peritonitis, we have first to mention the bacterium coli, on account of both its frequency and virulence. In a total of 171 cases we have found it 116 times alone, and 19 times mixed with other forms of bacteria—altogether 135 times out of a total of 171 cases. Next in frequency, though not inferior in virulence, was the streptococcus, found unmixed in 14 cases, and combined with other bacteria 21 times,—altogether about 35 times in 171 cases. The appended table, taken from A V Moschcowitz's meritorious paper,* will aid in the estimation of the frequency of the various forms of bacteria.

	Cases	Recovered	Died
Bacterium coli	116	89	27
Bacterium coli and streptococcus	14	10	4
Streptococcus	13	9	4
Friedlander's bacillus	4	4	0
Pneumococcus	3	3	0
Staphylococcus alb	3	2	1
Streptococcus and staphylococcus alb	4	2	2
Proteus vulgar	4	2	2
Proteus and bacillus coli	2	1	1
Bac coli and unknown bac	2	1	1
Bacillus pyocyaneus	2	1	1
Bac. coli, pyocyaneus, staphylococci and streptococci	2	1	1
Bac coli and staphylococcus aureus	1	1	0
Streptococci and Friedlander	1	1	0
	171	127	44

The third factor of greatest importance is the time elapsed since the perforation. At last year's (1908) meeting of the American Surgical Association, John B Murphy of Chicago

* Zur Appendicitisfrage. Ein Bericht über 2000 consecutive Fälle, etc. Archiv f klin Chir Bd 82, p 683

presented an admirable paper on our subject in which he published the records of 49 cases of spreading free perforative peritonitis mostly appendicular (42) in none of which had more than 40 hours elapsed since the moment of perforation. In the majority of these cases the operation followed perforation within twenty two to thirty hours. Two only of the patients died a most remarkable showing.

Heartily approving of the attitude of Murphy in laying the greatest stress on early operating we may yet pertinently raise the question. Were all of these cases really such that uninfluenced by an operation they would certainly have progressed to the death of the patient? Would not a number of them have ceased to spread and become however large circumscribed abscesses? Whatever the answer to this question may be the fact stands unimpeached that surgical measures such as were employed by Murphy were followed by the recovery of 47 patients out of 49—to the early interference undoubtedly belonging the principal share of the success.

On the question of time hinges to the greatest degree the condition of the patient. The longer the time that has elapsed since perforation the larger becomes the area involved and the deeper the state of general intoxication. On these conditions again depends the state that determines paralytic ileus interference with the heart's action and its ultimate exhaustion foreshadowed by cutaneous cyanosis a rapid thready pulse and clammy integument. Happy the surgeon whose experience in perforative peritonitis is limited to cases of not more than 40 hours duration! In the wards of Mount Sinai Hospital these cases were rare exceptions—the majority of them being of three four seven days and even of longer duration.

To be classed as open diffuse progressive peritonitis each case had to present all or the majority of the following clinical characteristics.

Beside a marked gravity of the combined impression made by the symptoms at an early stage—

1. Sunken features anxious expression

- 2 High rate of pulse and respiration
- 3 Pronounced distention
- 4 General rigidity of abdominal muscles, flexed thighs
- 5 General abdominal pain
- 6 General tenderness, including the pelvic peritoneum on vaginal or rectal touch
- 7 Constipation, often preceded by diarrhoea
- 8 Frequent projectile vomiting
- 9 The presence of a free movable fluid in the peritoneal cavity, proven by percussion

It need hardly be said that there exists unending variety in the prominence of one or the other symptom, or of groups of symptoms

On the operating table, the peritoneum being incised, large quantities of turbid, sero-purulent or frankly purulent exudate must be seen escaping under considerable pressure from all the accessible parts of the cavity. The insertion of the hand or a glass tube into the flanks and pelvis should cause the escape of free exudate. Though this test was regularly made, its value, for obvious reasons, was not considered absolute. In very far-gone cases, the delays caused by it forbade its application. But even where it was admissible, its value had to remain relative, as we know that,—especially in late cases,—enormous exudates may exist that have the semblance only of being diffuse. In reality, they are circumscribed and limited by a wide rampart of adhesions. In classifying a given case of peritonitis, this circumstance may be the most fruitful source of error, leading, according to the bias of the surgeon, either to under-estimation or to exaggeration. The corrective must be sought in the general features, the principal criterion remaining the apparent danger to the patient's life. *The ascertainment of the degree of diffuseness is, and will remain, the weak link in the diagnostic chain.* Recognition of this fact should admonish to caution and modesty. In the later stages of the malady, the presence of a circumscribed abscess occupying remote portions of the peritoneum, is strong evidence of the wide diffusion of the original

process. These secondary foci represent residual abscesses.

None of our recent cases of perforative or non perforative appendicitis in which a free unconfined sero purulent exudate was found to occupy the immediate vicinity of the damaged appendix involving only the right iliac region or the pelvis were included in this series.

Besides the free unconfined exudate we generally have found a deeply congested visceral and parietal peritoneum invested here and there at the line of contact of adjacent coils of intestines by fibrinous deposits or we found merely its lustre gone. The intestine was much distended its retention in the peritoneal cavity demanding special measures.

The observation that in the presence of a frankly purulent and free exudate the lustre of the peritoneum may be found intact is explained by the absence of the more virulent forms of bacteria such as the bacterium coli or the streptococcus or the pyocyaneus and by the abundant presence of the staphylococcus albus * which is a powerful agent for stimulating phagocytosis. In these cases the original agents of infection have evidently disappeared.

As mentioned above we have in addition to the 461 cases of appendicular free progressive peritonitis to report another group of one hundred and forty eight (148) cases in which the infection of the peritoneum was due to contamination from other viscera than the appendix. It was deemed proper to segregate these cases from the former for the reason that in most of them the conditions causing perforation were in themselves of the gravest—in many cases of a fatal—character. Such were *e g* cancers of the stomach and intestine that caused perforation volvulus and hernia with extensive gangrene. Of these 148 patients twelve (12) were not operated upon death being imminent. They were excluded from the calculation of the therapeutic results.

Indications—Except where death was imminent our rule was to operate in every case as soon as possible. Reviewing the phases through which our indications and treatment of

* Dudgeon and Sargent Bacteriology of Peritonitis 1903




free progressive peritonitis have passed within the last ten years, we find that in the first two or three years of the period under consideration we invariably operated as soon as we could. The mortality was very great. This must be attributed partly to the circumstance that most of the patients had been ill with peritonitis for more than 48 hours, and that the operative measures employed were too incisive, consisting in multiple incisions, more or less complete eventration, sponging, irrigation, and a complicated system of drainage by tubing and packings. Under this regime, our mortality in 1899 reached 79 per cent,—that is, 30 died out of a total of 38 patients. We then modified the treatment inasmuch that in very far-gone cases the stomach was emptied by lavage, the rest of the treatment consisting in the administration of opiates and nutrition by rectum. We then observed that in a respectable percentage of the cases the patients, seemingly doomed by the extent, and presenting all the classical symptoms of the malady, did not die. After a certain number of hours of extreme peril, flatus began to pass, the distention diminished, vomiting stopped, and the facial expression became distinctly improved. Physical examination revealed that the signs of a free exudate having disappeared, their place was taken by those of one or more circumscribed intraperitoneal abscesses. These being incised and drained, the patients almost regularly recovered. We were inclined to assume that the lives of these far-gone patients were saved by our abstention to operate. But in this assumption there was this error—that the saving clause of our abstention lay not in the bare fact of not operating, but rather in our eschewing the heroic and exhausting measures previously in vogue. The truth of this became evident when, milder methods being followed and our rate of success increasing, we began to extend again the range of our indications for immediately operating on the severer and severest cases. The experience of the last five years shows that immediate operation is preferable to procrastination, provided that the measures employed do not involve too great a draft on the patient's power of endurance.

Unhesitatingly it may be asserted that in the vast majority of cases procrastination is more dangerous than operation. Hence the rule was followed by us never to delay operation on a newly admitted case of peritonitis longer than was demanded by the necessary preparations. This rule was applied also to all cases of circumscribed intraperitoneal abscesses of appendicular origin. The reason therefor was the observation that one of the most dangerous forms of peritonitis was caused by the rupture of those abscesses. It may be occasioned by vomiting or by pressing at stool or even by the exertion necessary to turn in bed. As the amount of hydrostatic pressure to which the adhesions limiting such an abscess are subject is an unknown quantity it is our duty immediately to incise and evacuate. A rupture occurring the sudden escape and continued outpour of large quantities of pus is one of the greatest dangers to which life can be exposed. Special measures were taken therefore at our hospital to organize the service in such a manner that patients admitted with peritonitis or with intraperitoneal abscesses were operated upon within not more than an hour after their reception.

Therapy.—To appreciate the influence of the treatment upon the final issue of our 461 cases of free progressive peritonitis of appendicular origin it will be useful to present the tabulated items in ten annual groups.

Year	Totals	Cured	Died	Percentage of mortality
1899	38	8	30	79.0
1900	45	1	24	53.3
1901	3	21	11	34.3
1902	29	17	12	41.4
1903	40	28	12	30.0
1904	38	27	11	29.0
1905	45	3	13	28.8
1906	68	56	1	17.6
1907	64	55	9	14.5
1908	62	53	9	14.0
	<hr/> 461	<hr/> 318	<hr/> 143	<hr/> 31.0

MORTALITY OF PERITONITIS 1899-1908

1899		79% 38 Cases
1900		53.3% 45 Cases
1901		34.3% 32 Cases
1902		41.4% 29 Cases
1903		30% 40 Cases
1904		29% 38 Cases
1905		28.8% 45 Cases
1906		17.6% 68 Cases
1907		14.5% 54 Cases
1908		14% 62 Cases
		<div> TOTAL, 461 Cases. AVERAGE MORTALITY 31% </div>

We see that, summing together all these cases, one out of three patients succumbed to the disease. But as the therapy, first very incisive, became materially modified in the last five years, it is proper to indicate the points which were changed.

Before we enter into the consideration of the details of our therapy, however, something must be said regarding the patients. They came, almost exclusively, from the over-

crowded tenements of the East Side. Though of sedentary occupations they were well nourished and being remarkably free from alcoholism presented human material of a fair degree of resistance to illness. But their unwillingness to abandon their cramped quarters for the hospital very frequently led to unwise procrastination and was the principal cause of the fact that in only a small fraction of the cases of perforative peritonitis admitted to Mount Sinai Hospital had perforation occurred within less than 48 hours. This circumstance has remained unchanged during the entire period covered by this report therefore the remarkable improvement of therapeutic results must in the main be due to the changed character of the treatment.

By examining our table we shall see that each annual group represents a respectable sum by itself descending below thirty (30) once only—the annual average being forty six (46) cases. In 1899 out of a total of thirty-eight (38) cases thirty (30)—that is four (4) out of five (5)—patients have died. A gradual and almost steady fall of the percentage of mortality per annum is manifest thus in 1900 there died one (1) patient out of two (2) in 1901 about one (1) out of three (3). By grouping the figures of the first five years together we find that one (1) out of two (2) patients succumbed while during the last five years only one (1) died out of five (5) patients. By segregating the cases that occurred during the last two years of the series—that is in 1907 and 1908—we see that the percentage of mortality descended to 14.0 and 14.5 respectively which means that we are now losing one (1) patient only out of seven (7) cases.

This showing though good is far from being as good as that made by John B. Murphy of Chicago who out of forty nine (49) patients succeeded in saving forty seven (47). But if we consider that in his collection there was none in which the peritonitis had lasted longer than forty (40) hours—one (1) had lasted only three (3) hours twenty two (22) to thirty (30) hours being the most common periods and on the other hand that with us these early operations were

rather the exception than the rule, our statistics representing everything that was admitted to and treated at the hospital,—the showing is really not so bad as it may appear on the first blush. While it confirms the conclusions drawn from Dr Murphy's report, that in peritonitis early diagnosis and early operation offer the best promise of increasing success, it also demonstrates that a rational treatment of the far-gone, neglected cases, formerly considered as hopeless, will succeed in saving a respectable and increasing proportion of patients.

The proportion of cases of peritonitis to those of appendicitis has been gradually diminishing from year to year. This is due to the fact that the general practitioner has learned to diagnose appendicitis more promptly. The absolute increase of cases of peritonitis during the last four years is accounted for by the increase of the number of available beds from seventy (70) to one hundred and thirty (130), consequent upon the enlargement of the surgical services in the new Hospital building.

COMPLICATIONS OF PERITONITIS

	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	Total
Mechanical ileus	6	1	1		1	1	3	5	2	4	24
Pelvic abscess	1	2	5	2	3	2	2	4		4	25
Subphrenic abscess		1		1			1	3	1	3	10
Mesocœlic abscess		3	1		1		1			2	8
Pylephlebitis							1				1
Mesenteric thrombosis	1										1
Fecal fistula	1		1	1			2	1		2	8
Gangrene of cæcum		1		1							2
Femoral phlebitis				1			1		1		3
Pyelonephritis		1									1
Pneumonia			1	1	2						4
Scarlet fever					1						1
Suicide		1									1

In surveying the complications of peritonitis arranged in annual groups, we see that in 1899, out of a total of 38 cases, mechanical ileus occurred 6 times, the quota being 15.8 per cent. This high rate we attributed to the employment of massive and multiple gauze packings, left in situ for drainage.

Of all the complications the most common was the formation of secondary abscesses—pelvic subphrenic and meso-coeliac*. Their aggregate was 43 that is they appeared in 9.3 per cent of 411 cases. They are regarded by us as residual in character representing the localized residue of what was originally a general peritoneal involvement.

The question Did Fowler's position favor the development of pelvic abscess? must be answered in the negative. They were not more numerous during the second half of the period when Fowler's position was systematically employed than before. It is also interesting to see that subphrenic abscesses were more frequent since Fowler's position came in use than before. Out of ten instances of this complication eight were observed since 1905.

Let us now cast a glance at the methods that were in vogue with us during the early years of the period under consideration and also indicate the manner in which our present day methods have developed. Our early efforts at the cure of diffuse peritonitis were dominated by the idea that we were dealing with a process if not identical at least analogous with phlegmon†. Extensive and multiple incision

* Thus I have designated abscesses which are not adjacent to the peritoneal parietes but are situated between and are limited by adjacent coils of intestine. They sometimes form movable tumors consisting of an aggregation of mutually adherent intestinal segments which enclose an abscess.

† Peritonitis an infectious inflammatory process of the surface of the serosa is distinct from phlegmon which implies destruction of tissue. The necrosis which produces perforation of a hollow viscus is generally a limited process of relatively small importance excepting the circumstance that it opens the way for the escape of infectious material into the peritoneal cavity. But sometimes peritonitis is induced—fortunately the cases are rare—by the extension of a phlegmonous retroperitoneal process to the peritoneal surface. Monro of Boston has demonstrated the occurrence of retroperitoneal lymphangitis and phlegmon consequent upon appendicitis. Here as well as in septic phlebitis of the roots of the mesenteric veins and the portal vein peritonitis is the complication of a far more dangerous and deadly process than peritonitis itself. The most timely surgical attention paid to this form of peritonitis may succeed in checking the peritoneal infection but will not save the patient's life. We have seen in these cases all the symptoms of peritonitis disappear

the object of which was the exposure and evacuation of septic accumulation of sero-pus and of pus, were the order,—supplemented by vigorous mopping and irrigation. The object was pursued with the utmost thoroughness, and no hesitation was felt in carrying measures to the point of systematic eversion, the purpose of which was a merciless toilette of all the affected surfaces. Replacement of the distended intestines being very difficult, multiple enterostomies were employed to evacuate gas and liquid fæces. Another practice, now abandoned, was then almost universal. It consisted in the use not only of abundant tube drainage but also of massive packings of gauze introduced into the various recesses of the peritoneum. These were removed either shortly after the operation, causing prolapse of intestines, or,—left in a long time,—were, we thought sometimes, the cause of mechanical ileus. Thus were added to the exhaustion caused by the malady, the depressing effects of prolonged anæsthesia and of heroic surgery,—resulting in a frightful rate of mortality. If any patients survived, they did so not in consequence, but

the general sepsis however continuing unabated until the patient's death. Post-mortem evidence of a more or less extensive retrocolic phlegmon, or septic pylephlebitis was found. It seems to be proper to refer here to the classification of appendicitis still in vogue in many clinics. The terms *primary*, *intermediate* and *late* are meant. It is stated that operations done on primary and late cases yield good results, while those done on intermediate cases are accompanied by a high rate of mortality. It is concluded, that here *the operation* constitutes the factor of danger, hence in an intermediate case no operation is admissible *unless the danger is very great*. It seems to us, that this line of argument is inconsistent and fallacious. First of all, the classification itself is vague, arbitrary, and not based on pathological fact. The danger, undoubtedly present in many cases that drag on to and beyond the third, fourth and fifth day without either resolution or the formation of a local abscess, is not due to any operation that may be done, but depends entirely upon the gravity of the local,—phlegmonous or phlebotic,—or of the general peritoneal process. Our extensive experience has amply demonstrated, that the earliest operation will, after all, yield the best chances of recovery to the patient, because by it one factor of danger, the peritonitis, may be, and is often eliminated. Thus, even a retrocolic phlegmon may, by exposure and proper drainage become manageable. At any rate, whenever death follows, this issue will be due not to the operation, but to a morbid process which has progressed so far as to be beyond control and remedy.

rather in spite of our therapy. Thus an attitude of general discouragement became universal.

But relief was at hand. It came from the growing conviction that the surgical elimination of the *causes* of peritonitis was the true way to combat the disorder. Early we learned to recognize the conditions which produce peritonitis and the earliest possible attack directed against appendicitis—the most common causative factor of the malady—became a measure which, against much opposition, has finally attained almost universal acceptance. The operative indications first timidly defined and surrounded by arbitrary and senseless acutelæ became more and more stringent. The rule not to operate before the third, fourth or fifth day after the onset of the appendicitis was gradually abandoned and prompt operations, done at any stage of the disorder, began to reveal to us all the phases of the process. This complete insight into the pathology of the malady strengthened the rationality of curative measures and immensely improved the effectiveness of therapy.

It also brought along with it another advantage. It enabled us to study *in vivo* by ocular inspection the earlier stages of peritonitis which, being confined to the immediate vicinity of the appendix, were taken care of, as it were, by the comparatively simple measures directed against the causative trouble.

Thus it became more and more evident that in peritonitis the stoppage of the leak, together with simple drainage of the focus of infection—and in the more diffuse forms with additional drainage of the most dependent, that is the pelvic part of the peritoneum, aided by Fowler's posture (causing gravitation of exudate into the pelvis)—would yield better results than the excessively exhausting methods of former days.

Regarding the importance of stopping the leakage of a perforated viscus, a radical difference must be made as to viscus itself. Perforation of the stomach, duodenum and the rest of the small intestine absolutely demands closure of

the leak, while in a perforation of the appendix or the gall bladder, such closure is of much less importance. The fact is that, as a rule, where the appendix has "in toto" become gangrenous, the gangrene even extending to parts of the cæcum, tamponade and local drainage have been found perfectly sufficient. We earnestly believe, however, that the pendulum has swung to the other extreme in the case of those surgeons who, laying great stress on a more or less thorough cleansing by irrigation of the peritoneal cavity, treat drainage as an evil, reducing it to an ineffective minimum,—as did Joseph A. Blake,* or abandoning it altogether, according to the example of Franz Torek†

The principles that guide us in the treatment of free progressive peritonitis may be summed up under the following heads

- 1 The most important preparation,—to be done if possible *before* induction of anæsthesia, if not, directly after tolerance has been attained,—is, where indicated by frequent vomiting due to paralytic ileus, lavage of the stomach. Under proper indications, while the field of operation is being prepared, the heart action is stimulated by saline intravenous infusion and by hypodermatic injection of alcohol, or of camphor and ether

- 2 The anæsthetic generally employed is nitrous oxide gas, followed by ether administered by the drop method

- 3 The first object to be attained is always the exposure of the primary focus of infection. In the absence of a reliable indication as to the viscus from which the infection comes, a Kammerer incision is preferably done on the right side. The reason for this is the knowledge that in the majority of cases peritonitis is caused by affections of the appendix and, next in frequency, of the gall bladder. The incision should be adequate,—that is, neither too large nor too small. Rapidity of action being paramount, a minute incision may delay work by the difficulty of finding the nidus of the trouble, or,

* Am. Journal of Medical Sciences, vol. 133, p. 454

† Medical Record, 1906, vol. 70, p. 849

on the other hand too large an incision will prolong the operation by demanding more sutures. Eversion should always be prevented by suitable measures.

4 The leak in the viscus especially if it concern the stomach duodenum and small intestine should be stopped by suture. In appendicular cases the diseased appendix should be removed and the lumen closed by simple ligature. If the tissues are brittle or gangrenous the site of the trouble should be packed with iodoform gauze.

5 The utmost weight is placed on husbanding the patient's strength by gentleness and rapidity of procedure.

6 The escape of the exudate from the iliac fossa the pelvis and flanks is favored by the gentle insertion of a rubber gloved finger or hand. No irrigation is employed.

7 The right iliac fossa and if necessary the cul de sac of Douglass are drained by the placing of a stout but soft rubber tube fenestrated at the distal end and containing a loose wick of iodoform gauze. The gauze wick favors the escape of enormous quantities of serum during the first 48 hours after the operation. To absorb all that is brought up by the gauze wick the external dry dressings are frequently changed. As soon as the capillary drainage begins to lag the wick is withdrawn the tube remaining in situ. To prevent inspissation and retention moist dressings replace the dry ones at this time. The objections raised by various surgeons against the use of rubber drainage tubes have not been sustained by our experience. We have never seen any complications that could with certainty be ascribed to their use. If the discharges remain serous the rubber tube should be withdrawn on the third or fourth day. If not the tube is the very thing to permit the escape of pus. As mentioned before since the abandonment of massive gauze packings in 1899 mechanical ileus has occurred less frequently. (Exception in 1906 is seeming only.)

8 The wound is closed by three layers of superimposed sutures one uniting the peritoneum the second (chromic catgut) the sheath of the rectus muscle the third the skin.

Usually the drainage tube is allowed to project from the lower angle of the wound

9 Paralytic ileus continuing, lavage of the stomach is done as often as needed. Very rarely is enterostomy required, to evacuate gas and liquid feces from the small intestine. When necessary, a distended coil is withdrawn, and an extraperitoneal stab is made*. The aperture is immediately closed by one or two Lembert stitches. Peristalsis of the large intestine is induced by low enemata, if these fail, by a high enema, and if this also fails, by repeated rectal lavage.

10 Opiates are administered hypodermatically whenever required. We do not share Lawson Tait's prejudice against the use of morphine, and consider its withholding cruel and harmful. After the operation nothing will better allay restlessness and spare the strength of the patient, than an opiate.

11 Food and drink are absolutely withheld as long as vomiting is present, but rinsing of the mouth is permitted.

12 Murphy's proctoclysis is systematically employed by us, and its use can be warmly recommended. It is important strictly to follow Murphy's directions in the arrangement of the apparatus, so as to avoid hyperdistention of the rectum. Eight to ten pints of normal saline solution will be readily absorbed in 24 hours. The essential point is that the reservoir should not be suspended higher above the level of the buttocks than what is hydrostatically necessary just to overbalance the intra-abdominal pressure. The elevation should have the effect of causing the entrance and absorption of one and a half pints of normal salt solution within from forty to sixty minutes. This quantity is to be given every two hours. "The flow must be controlled by gravity alone, and never by forceps or constriction of the tube, so that when the patient endeavors to void flatus, or when he strains, the fluid should rapidly regurgitate into the can, otherwise it will be discharged into the bed." (Murphy)

* Dr. Howard Lilienthal has constructed an ingenious trocar cannula for this special purpose by which intestinal contents may be withdrawn without leakage and soiling. ANNALS OF SURGERY, June, 1906

13 The operation finished the patient is placed in Fowler's position this is maintained as long as distention vomiting and a high rate of pulse are present

14 Persistence of fever after the disappearance of vomiting and distention indicates the search for secondary intra peritoneal abscesses According to their ascertained situation these are attacked from in front or through the loin or through the vagina or the rectum

15 Laxatives usually calomel and salts are not administered before the stoppage of projectile vomiting

16 Packings that wall off necrosed areas are left in situ until they become loose and detached by the process of granulation

To recapitulate all our measures are dominated by these requirements early and rapid operation stopping of leakage peritoneal drainage aided by posture maintenance of the patient's strength by enteroclysis withholding of food and drink while vomiting persists and finally the discreet administration of opiates

PERITONITIS FROM OTHER CAUSES THAN APPENDICITIS

We shall conclude this paper by giving a synopsis of 148 cases of free progressive peritonitis observed in the indicated period at Mount Sinai Hospital which were due to other causes than appendicitis

TUMORS

	Died
Perforation of ulcerated carcinoma of stomach	1
Perforation of ulcerated sarcoma of jejunum	1
Perforation of carcinoma of large intestine	3
	<hr/>
	5

Mortality 100 per cent

PERITONITIS DUE TO INTESTINAL PERFORATIONS

	Recovered	Died
Gunshot injuries	3	
Perforations of rectum by syringe point during administration of enemata		2

Subcutaneous rupture of intestine by external force	I	4
Penetrating wound of abdomen and intestine from a sharp piece of wood		I
Perforation of ileum by fishbone		I
Ulcerative perforation of intestine (non-typhoid)		5
	—	—
	4	13
Total		17
Cured		14
Died		13
Mortality, 76.5 per cent		

In all the four cured cases, only a few hours had elapsed between injury and operation. Most of the fatal cases were in extremis when admitted.

PERITONITIS CAUSED BY COMPLICATIONS OF HERNIA

Of sixteen (16) cases, ten (10),—when admitted with diffuse spreading peritonitis due to gangrene, with or without perforation of the strangulated intestine,—were in such a bad condition that nothing could be done than to withdraw, fasten in the wound, and incise the decayed gut. All of these patients died within a very short time after admission. Four times the general condition of the patients seemed to warrant, in spite of the complicating peritonitis, resection of the necrosed small gut. One of these patients recovered, three died. In one case of strangulated inguinal hernia a diffuse bacillus coli peritonitis was present, though the gut was neither gangrenous nor perforated. Reposition and drainage led to recovery. In one case, a perforation of the small intestine situated 8 cm. above the point of strangulation, was overlooked. The strangulated knuckle was sound and was replaced, the pelvis was drained, but the leak having remained open, the patient died.

	Cases
Total	16
Cured	2
Died	14

Mortality, 87.5 per cent

PERITONITIS DUE TO DISEASE OF THE FEMALE GENITALS

Sixteen times we had to deal with free spreading peritonitis caused by disorders of the female genitals

	Recovered	Died
Twisted ovarian cyst and gangrene		2
Incarcerated fibroid and gangrene		1
Criminal perforation of uterus prolapse and gangrene of small intestine		1
Ruptured pyosalpinx		1
Double pyosalpinx	4	2
Infected ovarian cyst after abortion		1
	4	8
Total		Cases 12
Cured		4
Died		8

Mortality 66.6 per cent

PERITONITIS DUE TO TYPHOID PERFORATIONS

	Cases
Total	3
Cured	6
Died	17

Mortality 73.9 per cent

PERITONITIS DUE TO PERFORATION OF DUODENAL AND GASTRIC ULCERS

There were observed altogether 13 cases of peritonitis due to duodenal or gastric perforation. In all the cases seven (7) by number where the perforation did not precede operation by more than 24 hours the patients recovered—in one case in spite of the fact that both the lesser and the greater peritoneal cavities were involved

	Cases
Total	13
Cured	7
Died	6

Mortality 46.1 per cent

One remained unoperated on

PERITONITIS DUE TO PERFORATION OF LIVER ABSCESS INTO PERITONEAL CAVITY

Out of a total of three (3) cases, one patient was saved. In this instance, the locality of the perforation was ascertained at the time of the operation. The liver abscess was separately drained, then the peritoneum was drained by way of the pelvis. In the two fatal cases the rupture of a liver abscess was revealed only by the autopsy.

	Cases
Total	3
Cured	1
Died	2

Mortality, 66.6 per cent

PERITONITIS DUE TO THROMBOSIS OF MESENTERIC VESSELS

This disorder caused gangrene of the ascending colon in one case. The patient was moribund at the time of the operation, and died shortly after the establishment of a cæcal anus.

	Cases
Total	1
Cured	0
Died	1

Mortality, 100 per cent

PERITONITIS DUE TO VOLVULUS AND INTUSSUSCEPTION

Intussusception causing peritonitis was observed once only. The infant died a few hours after reduction.

Volvulus complicated with extensive free peritonitis was observed six (6) times. Once only was the twisted gut not gangrenous. In this case the patient died of peritonitis. One patient suffering from extensive gangrene of the cæcum, died at the beginning of anæsthesia. Once, in a case of twisted sigmoid with gangrene, colostomy only could be done, as the patient's condition was extremely precarious. He died. In a case of gangrenous volvulus of the small intestine, we had, on account of the state of the patient, to content our-

selves with attaching the gut to the parietes and incising it. This patient died also. Only twice was the resection of the gut found to be warranted. In one case 45 inches of small intestine were resected recovery following. In the other two feet of the gangrenous sigmoid were removed the patient dying of continued peritonitis.

	Cases
Total	8
Cured	1
Died	7

Mortality 87.5 per cent.

PERITONITIS DUE TO INJURY AND AFFECTIONS OF THE BILIARY TRACT

Out of twenty four (24) cases acute gangrenous cholecystitis with or without perforation was twenty three (23) times the cause of diffuse progressive peritonitis. Once the malady was complicated with actual parturition during which the perforation of the gangrenous gall bladder must have occurred. Forceps delivery was done the patient died so shortly after this that no chance was afforded to operate for the peritonitis. In another case during the progress of her niotomy for strangulation the signs of a biliary peritonitis became evident. Exposure of the gall bladder revealed gangrene and perforation of the viscus. Evidently the vomiting due to the biliary peritonitis had caused the strangulation of the hernia. This patient also died. Of the remaining twenty-one (21) patients eight (8) recovered after operation which consisted in extirpation of the diseased gall bladder whenever a suitable living pedicle could be fashioned. Where this was not feasible the gall bladder was drained by rubber tubing and the gangrenous parts were segregated by suitable gauze packings. In one instance a child six months old having been run over by a vehicle twelve days before admission entered the hospital with far gone peritonitis. Incision and drainage of the peritoneum were done but the child died a short time afterward. On autopsy a rupture of the cystic duct was found.

	Cases
Total	24
Cured	8
Died	16

Mortality, 66.6 per cent

PERITONITIS DUE TO ACUTE HEMORRHAGIC PANCREATITIS

Six times was peritonitis observed caused by acute hemorrhagic pancreatitis. The treatment was incision and drainage. Five of the patients died, one recovered.

	Cases
Total	6
Cured	1
Died	5

Mortality, 83.3 per cent

PERITONITIS DUE TO UNKNOWN CAUSES

Twenty times patients suffering from far-gone peritonitis of unknown origin were admitted, where, for one reason or another, nineteen times out of the twenty the cause of the disorder could not be ascertained. Six times operation was refrained from as death was imminent. In five of these cases no permission could be secured to perform autopsy. Once autopsy was held, but yielded a negative result. In the fourteen cases that submitted to operation, the cause of the disorder was ascertained twice only: once at operation, leaking tubes were found, this patient recovering; in the other case, the operation did not throw light upon the state of affairs,—on post-mortem, however, infarct of the spleen was uncovered. In another case, on operation, an enormously distended colon was encountered. Colostomy was followed by recovery, and the artificial anus was later closed by operation. The cause of the trouble remained unknown. In the rest of the fatal cases the cause of the peritonitis was revealed neither by the operation nor by painstaking autopsy.

Total of cases	20
Total of operated cases	14
Cured operated cases	2
Died operated cases	12

Operative mortality, 70 per cent

In concluding I fulfil a pleasant duty by extending my thanks to my colleague Dr Howard Lilienthal whose material I was permitted to add to that furnished by my own service. As the methods of treatment employed in both services were nearly if not entirely identical this circumstance will not retract from the value of this communication. I also take pleasure in thanking my Adjunct Dr Alexis V Moschcowitz for collecting and putting in shape the statistical material that has accrued since the publication of his excellent report on 2000 cases of appendicitis published in *Archiv für klin Chirurgie** and of all our cases of peritonitis of non appendicular origin

* Loco cit

BONE PLASTIC FOR SKULL DEFECTS

BY E R ROST, Major I M S,

OF RANGOON,

Junior Civil Surgeon

At the Rangoon General Hospital, where cases of compound depressed fracture of the skull are exceedingly frequent, it often becomes necessary to remove large areas of bone. The result of such removal is often to cause large depressed pulsating scars, and several such cases having come under my observation years after operation, caused me to adopt the following curative procedure

A Burman, aged 32, was admitted to hospital with a sinus discharging sanious pus and leading down to necrosed bone on the right side of the head, over the mid-parietal area. The sinus opening was situated anterior to a depressed pulsating scar, 3 inches long by 1 inch broad, the appearance being unsightly. He complained of slight headache and giddiness and said he had been subject to fits of convulsions every two or three months since the injury, two years previously. He had been operated on for a large compound depressed fracture of the skull caused by a heavy sword-cut about two years before.

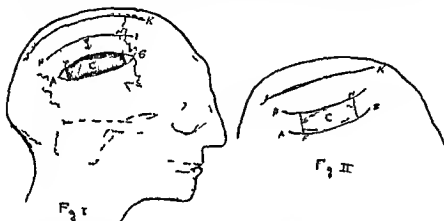
The following operation was devised so as to make a bone flap contiguous with its nutrient supply, to cover over the hole in the skull and to correct the deformity.

Two semilunar incisions *A, B*, around the depressed scar *C*, were made so as to excise the whole of the scar tissue and the sinus leading down to dead bone.

The small piece of necrosed bone, together with the irregular edges of bone, were removed with Hoffmann's bone-cutting forceps and care was taken not to evert the skin flap edges or separate the layers of tissue and periosteum from the bone. A semilunar incision *H, I* was made one and a half inches from and parallel to the semilunar incision *A, B* down to the bone and the bone was cut with a Hey's saw between *L* and *M*, so that *L, M* was equal or slightly longer in length to the edge of the hole in the skull.

C After making a slight cut into the outer table of the bone from *L* to *M* the Hey's saw was turned flat and the outer table of the bone split in half by sawing in the area *L,M,P,E*. Similarly the outer table of the skull along *P,E* was sawn to meet the sawing from *L,M*. Care was taken not to separate the skin incisions or to allow the periosteum to be injured.

With a narrow chisel the outer table of the bone was cut along *L,P* and *M,E* and the chisel introduced to finish off and separate the sawn off portion of bone from the bone below. Thus a flap of bone containing the outer table of bone with its periosteum attached and all the tissues above was separated from the



bone below and then the whole flap *H,I,A,B* containing underneath it the quadrilateral piece of bone was slid down to cover over effectually the exposed area *C*. And the quadrilateral area of bone being very slightly larger than the opening in the skull it could not sink down into the cavity *C*. A still longer incision *J,K* into the skin and subcutaneous tissues only was then made to form a skin flap to close the area left by the sliding down of the bone flap and it was found that the three incisions *J,K*, *H,I* and *A,B* could be united with sutures without dangerous tension.

The wound healed by first intention and the man was shown at the local branch meeting of the British Medical Association he had no deformity no headache or giddiness and six months after this operation he had had no recurrence of fits.

PING-PONG-BALL INDENTATION OF THE SKULL WITHOUT FRACTURE

BY WILLIAM H. LUCKETT, M.D.,
OF NEW YORK

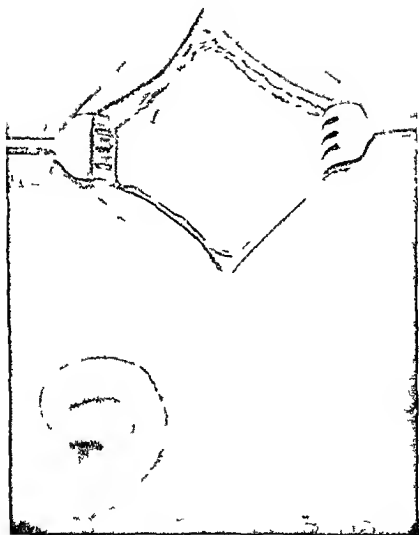
THE following case is reported because we have not seen its parallel in a large series of fractures and other injuries of all description of the skull, and because we have not been able to find its analogue in literature

CASE I—P. L., five and a half months old, was admitted to my service at the Harlem Hospital, June 8, 1908, with the following history. While sleeping, the infant was said to have fallen from a low couch, a distance of less than two feet, striking the left side of the head on the floor. Vomited profusely immediately after the accident, and while rational has been very irritable and refuses the breast.

Physical Examination—Fairly well nourished infant, conscious. Abdomen somewhat "pot bellied", slightly enlarged epiphyses, slight "rosary" at junction of the ribs and the sternal cartilages. The posterior fontanelle was closed and the anterior fontanelle was nearly closed. Please note, therefore, that there were no marked signs of a well-developed rachitis.

Over about the centre of the parietal bone on the left side there was a well-marked three-cornered depression, visible both to the eye and on palpation. There was no ecchymosis, abrasion or other external manifestation of the injury on the skull excepting the above-mentioned depression. Pupils normal, react to light, and no change in the fundus, temperature normal, and no marked slowing of the pulse, no local manifestation of intracranial pressure, no muscular rigidity. Mental condition of the child was one of marked irritability.

Operation Under Chloroform—An incision was made over the depression, the bone exposed, when the depression, a counterpart of that seen before the incision in the scalp, was noted in the skull, viz., a three-sided pyramidal depression with the lines one



Id t t kull with t fra t

and a quarter inch long the corners of which were represented by curved bone and not by lines of fracture as usual. In other words we had here a similar tri cornered depression or indentation noted in a thin celluloid ping pong ball (See Fig 1). A small quarter inch button was removed from the bottom of the depression with a small crown trephine attached to a modified Hamilton bone drill. A blunt hook was inserted beneath the skull and traction made the depressed bone was easily drawn into position. It was noted that when traction was made on the depressed bone and after it had reached a certain point past the force or power that kept it depressed the bone popped outwards into place. A small flat silver probe inserted between the dura and the skull did not reveal a fracture nor was a line of fracture visible from the exterior. The skull was not quite one sixteenth of an inch in thickness. The bone button was left out the scalp was sutured in position no drainage wound dressed and the child returned to the ward in a good condition. The second day following the operation the child was discharged from the hospital and was treated afterwards in the Out Door Department and had an uneventful recovery. In other words we had here a case of cerebral irritation from pressure of the indented very thin flexible skull without fracture.

We obtained a dozen ping pong balls and by holding them firmly in the hand and striking both sides consecutively against a solid flat surface reproduced the same tri cornered depression nineteen times out of twenty four. The other five depressions were quadrilateral. This tendency to form tri-cornered depressions from a blow produced by a flat surface seems to be characteristic of hollow spherical bodies with thin walls and might have some medicolegal value relative to injuries of the vault.

TUBERCULOSIS OF THE LIP

BY GEORGE E ARMSTRONG, M D,
OF MONTREAL

THERE was admitted to one of my wards in the Montreal General Hospital on February 18, 1907, a man 53 years old, complaining of a sore on his lower lip. His personal history was negative. Father alive, 85 years of age. His mother died when he was three years of age and he does not know the cause of her death. He has no full brothers or sisters. He states that there has never been any lung trouble in the family.

The trouble began as a small red spot that first appeared on the lower lip in November, 1906. It was situated midway between the centre and the angle of the mouth, on the left side. It was not painful, and gradually became covered with a dry, heaped-up scale. He frequently pulled the scale off, when the surface beneath appeared red but did not bleed. The area gradually grew larger. Vaseline, alum and various salves were applied but without benefit.

On admission there was present an ulcerated area on the left side of the lower lip, somewhat oval in outline, about $1\frac{1}{2}$ cm in length and 1 cm in width, situated between the midline and angle of the mouth and as much on the mucous membrane as on the cutaneous surface. The edges were somewhat thickened and elevated but not undermined. The base is only very slightly indurated, of a pale yellowish color and dry. For a short distance around the edges of the ulcer the skin and mucous membrane are reddened and slightly infiltrated. One enlarged gland is palpable in the submaxillary region and one in the submental.

The ulcer itself felt soft, and the absence of infiltration and hardness from the base suggested that the condition might not be an epithelioma. In fact, the general appearance of the sore, its history, and the associated conditions, suggest the possibility of its being either a primary sore or a tuberculous ulcer. The former might be excluded from the fact that there was very little induration of the base, although the ulcer had been present for three months, there was no history of any secondaries, and

none were present at the time also from the fact that the lymphatic involvement was confined to two considerably enlarged discrete glands

He was a fairly well nourished man but had suffered from a cough accompanied by scanty expectoration for some months Dulness and fine crepitation were present over both apices and the infraclavicular regions in front There was dulness over the right upper lobe behind together with bronchial breathing and whispering pectoriloquy There was no sign of any ulceration about the tongue mouth or fauces The skin of the face was smooth no rash of any kind being present

The growth was removed together with the glands The patient made an interrupted recovery and left the hospital March 7 1907 The pathologist reported that the ulcer and glands removed were tuberculous without any evidence of malignancy

Tuberculous ulcer of the lip is very rare more uncommon indeed than tuberculous ulcer of the tongue

Vollmann saw two tuberculous ulcers on the lips One in a young girl with multiple tuberculous foci and sound lungs the other in an old woman In the first case the deep ulcer was removed by a V incision In the second case caustics had been applied and the resulting sclerosing of the connective tissue together with the thick crusts on the surface gave it the appearance of a carcinoma for which it was taken

Schuchardt (*Deut med Woch* 1889 xv 1075-76) has reported a large tuberculous ulcer occurring upon the upper lip of a laborer 43 years of age with good family history He had always worked very hard and for eighteen months had suffered from shortness of breath and cough and had lost weight rapidly The ulcer began as a small fissure in the left half of the upper lip and gradually enlarged There had recently for about fourteen days been a discharge from the right ear He was a large poorly nourished man with very flabby musculature and clear indications of lung disease were present

On the left side of the upper lip was a defect 3 cm long and $\frac{1}{2}$ cm deep throughout its whole extent so that when the mouth was closed the upper incisor teeth were visible The

edges were sharply defined. The ulcer extended to the median line, and from below the whole upper lip looked swollen and thickened. The base was covered with thick dry grayish yellow crusts, which, on being removed, left a smooth oozing surface. The teeth were firm and covered with tartar. The gums were swollen, blue in color, and presented small ulcers here and there. On the mucous membrane of the right cheek, opposite the last two teeth, was a small nodular mass the size of a 10-pfennig piece, and in the centre of this was a small ulcer with fissured borders. The border of the mucous membrane around was of a bluish white color, with small gray nodules here and there. There were no ulcers or thickened areas on the tongue. The left half of the velum palati was red. Between the arcus pharyngo and the glossopalatinus was a flat irregularly shaped ulcer with red borders. Tubercle bacilli were found on the base of the ulcer on the lip as well as in those on the cheek and on the palate.

In Lord's case an ulcer appeared first on the right tonsil, and then an irregular small soft ulcer on the inside of the left cheek. Later on the ulcer in the cheek spread to the upper lip, which became greatly swollen, and then extended down to the lower lip. The diagnosis lay between specific disease and epithelioma. Three throat specialists, by whom he was examined, regarded the condition as malignant. The skin lesion presented many of the appearances of specific disease. A section of the skin was removed and examined by Dr Barker who found it to be tuberculous.

This variety of tuberculosis of the skin would seem to be very rare. In 4000 postmortems made by Chiari, there were only five cases of tuberculosis of the skin, and these occurred in the regions where the mucous membrane and the skin came together on the lips, about the anus, and, in one case, on the skin back of the ear.

There are thus seen to be two distinct groups of tuberculous ulcers of the lips. First, the solitary ulcer beginning on the lip itself, of which my case was an example, and, secondly, ulcerated areas that are secondary to, and invasions

from the mucous membrane of the buccal cavity or to tuberculous diseases of the adjoining skin of the face as sometimes occurs in lupus

Tuberculosis should be suspected when an ulcer on the lip or tongue presents a soft base with but little evidence of induration or infiltration and especially when there are evidences of tuberculosis elsewhere. A diagnosis cannot be definitely arrived at without a microscopical examination. It may be sufficient to examine scrapings from the surface

SUTURE OF THE RECURRENT LARYNGEAL NERVE *

WITH REPORT OF A CASE.

BY J SHELTON HORSLEY, M D,

OF RICHMOND VA,

Professor of Principles of Surgery and Clinical Surgery in the Medical College of Virginia,
Surgeon to Memorial Hospital

THE literature on surgery of the recurrent laryngeal nerve is very scanty. A thorough search of the literature in the library of the Surgeon-General's office, at Washington, has not revealed a single case of suture of this nerve in man. Consequently, the case reported below is apparently unique. There has been some work done along experimental lines, in which the left recurrent laryngeal was divided and its distal end inserted into the vagus higher up. These experiments have been carried out chiefly with a view to the cure of a disease in horses called "roaring." This peculiar affection is caused by paralysis of the left recurrent laryngeal which abolishes the function of all the intrinsic muscles on the left side of the larynx except the cricothyroid, a muscle supplied by the superior laryngeal. It always occurs on the left side, as the greater length of the left recurrent laryngeal and its course around the aorta render this nerve subject to any lesion that involves the aorta, or to excessive functional strain upon the aorta. So far as the appearance of the larynx is concerned, resection of the left recurrent laryngeal presents conditions identical with those found in a "roaring" horse.

J BROECKAERT's experiments on monkeys (*Annales de la Société de Médecine de Gand*, 1904, p 209) show results similar to those of like experiments on the dog, the rabbit and the guinea pig. Resection of a portion of the recurrent laryngeal

* Read before the Southern Surgical and Gynecological Association, December 14, 1909.

nerve was followed by decided and progressive atrophy and degeneration of the external thyro arytenoid muscle and by less pronounced nutritive changes in the internal thyro arytenoid and in the posterior and lateral crico arytenoids. He thinks that similar effects of resection of this nerve are to be expected in the human subject.

E. COTTERELL (*Veterinarian* 1893, p. 357) performed operations on three dogs and one donkey. After division of the left recurrent laryngeal nerve he found the muscles of the left side of the larynx were paralyzed and placed in a condition similar to that in horses affected with roaring. The recurrent nerve was cut across and its peripheral end carefully dissected out for about an inch. The left vagus was then found and was divided a little higher than the level of the section of the recurrent laryngeal nerve. The end of the peripheral portion of the left recurrent laryngeal was then sutured along with the peripheral end of the cut vagus into the upper end of the vagus. Two experiments on dogs were failures. The third dog on which this operation was done was examined five months and three weeks later and the left side of the larynx was seen to be working well but not quite so well as the right. Cotterell thinks this was due to the fact that the period of time that had elapsed between the operation and the examination was not sufficient for the nerve to regenerate fully. The dog was killed and the dissection showed that the peripheral end of the left recurrent had united to the vagus. The experiment upon the donkey was done January 30, 1892 and laryngeal examination on April 22, 1893 showed that the left side of the larynx worked synchronously with the right side and just as well. The dissection showed that the peripheral end of the left recurrent laryngeal nerve had united with the vagus.

F. MACDONALD (*Atti del XI Congresso medico internazionale* 1894, p. 111) performed somewhat similar experiments taking a section from the left recurrent laryngeal in order to prevent any reunion with the proximal end and grafting the distal portion into the trunk of the vagus. Two years after the operation the result was said to be successful.

These experiments seem to prove that surgery of the recurrent laryngeal nerve has a wider field than has heretofore been supposed. If so much of the nerve has been destroyed as to make a direct suture impossible its distal end can be grafted into the vagus with hope of eventual restoration of function. We must remember however that though many

of the experiments quoted were successful, the nervous structure of the human being is more difficult to repair than that of a lower animal. Even in man, different individuals often present variations in their readiness of repair of injured nerves, which cannot be accounted for by obvious conditions.

On account of its anatomical position, lesions are more likely to occur in the left recurrent laryngeal than in the right. Affections of the aorta are a frequent cause of paralysis of the left nerve and diseases and injuries of the thyroid gland may involve either of the recurrent laryngeals. They are sometimes injured during operation on the thyroid gland, and in such cases suturing the nerve should give excellent results. Occasionally, paralysis of the left recurrent, resulting from dilatation of the aorta, might be treated by transplantation of this nerve into the vagus, though, as a rule, the disease of the aorta would contraindicate operation.

In the following case the left recurrent laryngeal was sutured about three months after injury.

Martha J., colored, forty years of age, married for twenty years, has had three children. Her previous health has been good except for the usual diseases of childhood. There is no history of syphilis or tuberculosis. On June 22, 1908, she was shot by a pistol, the ball entering at the lower border of the chin about the median line and just grazing the bone. It was evidently deflected by the bone and took a course downward and to the left, just beneath the skin, to the larynx where it penetrated deeper in the neck. Just above the larynx the bullet so nearly penetrated to the surface that a keloid developed as a result of the injury to the deep layers of the skin. After striking the left side of the thyroid cartilage the bullet took a deeper course, wounding the left recurrent laryngeal nerve. There was only slight bleeding at the time, but the patient's voice was at once affected and was so hoarse that she could not speak above a whisper. She readily recovered from the immediate effects of the injury and was referred to me by Dr J S Gale, of Ivor, Va., on August 17, 1908. The bullet was located with the X-rays in the left side of the root of the neck, about half way between the clavicle and the outer border of the trapezius muscle. The patient could not

speaking above a whisper and seemed to have considerable difficulty in breathing. The condition of the larynx is described below in the report of Dr. Miller.

Operation was performed under ether August 20, 1908. The bullet was first removed and an incision was made along the anterior border of the left sternomastoid muscle. The centre of the incision corresponded to the lower limit of the larynx. The sternomastoid together with the carotid artery and the jugular vein was retracted toward the left. The left lobe of the thyroid gland was exposed and was retracted along with the trachea and larynx to the right. The recurrent laryngeal nerve was identified where it runs in the groove between the trachea and œsophagus. It was found to be injured just before its entrance into the larynx and was involved in a small mass of scar tissue where the bullet had evidently grazed the nerve. The diseased portion about one third of an inch in length was excised leaving a small filament which was probably the posterior portion of the sheath of the nerve with a few fibres that had escaped direct injury. The proximal part was freely loosened to relieve tension and the nerve was sutured with No. 0 twenty-day chromic catgut in a fine curved needle. Some muscular tissue was drawn over the sutured nerve. The skin was closed with interrupted silkworm gut. The patient had difficulty in breathing before the operation and seemed to suffer from dyspnoea to such an extent that the anaesthesia was begun with some apprehension. However she stood the anaesthetic well and reacted satisfactorily.

August 23, 1908 it was noted that the voice and dyspnoea were the same as before the operation. August 29, 1908 the wounds had healed perfectly but there was no improvement in speech. The patient was discharged August 29, 1908. The dyspnoea disappeared before speech improved. On the last examination November 16, 1909 the patient could breathe without difficulty.

Dr. Clifton M. Miller, professor of rhinology and laryngology in the Medical College of Virginia, examined this patient the day before operation and on two occasions since operation. I am much indebted to him for the examinations and for his reports.

August 18, 1908 the day before operation he wrote as follows: "I have to-day examined the patient Martha Johnson sent by you for laryngeal examination. Her voice is extremely hoarse and produced with effort. Intralaryngeal examination reveals

complete paralysis of the left vocal cord, except such tension as is given it by the action of the left cricothyroid muscle. It lies in the cadaveric position. During phonation the right cord in adduction passes the median line in an effort to approximate the left cord, which remains motionless. The larynx is much congested in the entire supraglottic portion. Diagnosis complete paralysis of the left recurrent laryngeal nerve."

October 26, 1908, Dr. Miller made the following report: "I examined the throat of Martha Johnson on October 20, 1908, and found that there is some very slight movement of the left vocal cord in the part that was motionless at the time of my last examination and there is less congestion in the larynx than was present at that time."

November 16, 1909, more than a year after his second examination, Dr. Miller wrote the following report: "I examined the colored woman, Martha Johnson, that you sent me for laryngeal examination a few days ago. There is almost perfect motility of her vocal cords, the left one lagging slightly behind the right in adduction, but the action of the laryngeal muscles indicates almost perfect recovery from the wound of the recurrent laryngeal nerve with practically entire restoration of function. The voice, while entirely changed from the hoarse tone of my former examination, lacks much in volume. This is due to a web-like adhesion between the anterior third of the vocal cords, limiting the size of the column of air which can pass through the rima glottidis, and also the length of cord that can be thrown into vibration for voice production. Section of this web with prevention of adhesion during healing would, in my opinion, entirely restore the voice. The adhesion between the cord is due, I think, to inflammation set up by the passage of the bullet and the long period of loss of function of the left cord. From the stand-point of restoration of function by anastomosis of the severed nerve ends, the case is a perfect success."

UNILATERAL LAMINECTOMY *

BY ALFRED S TAYLOR, M.D.,

OF NEW YORK

Visiting Surgeon to the Hospital for Children, New York City
 Visiting Surgeon to the Hospital for Children, New York City
 Visiting Surgeon to the Hospital for Children, New York City
 Visiting Surgeon to the Hospital for Children, New York City

IN December 1908 while considering the resection of posterior spinal roots the thought suggested itself that a procedure less extensive and bloody than the usual bilateral laminectomy would be desirable

A series of trials upon the cadaver made it evident that ample room could be had by unilateral laminectomy not only for resection of nerve roots within the spinal dura but for many of the other purposes for which the spinal canal is opened

So far as I know the operation is original and was first done upon the living subject on December 16 1908 in a case of Dr T P Prout's Since that time occasion has arisen to use the same technic upon various parts of the spine in four other cases (five in all)

The operation is as follows The patient is placed face downward sometimes flat sometimes with the body slightly tilted to one side In the five cases operated upon ether has been used The incision is made just to one side of the spinous processes and of sufficient length for the purpose in hand The knife is carried close to the sides of the spinous processes down to their bases A broad deep retractor is used to pull the muscles outward (incidentally stopping hemorrhage) and the deeper layers of muscle are easily separated from the laminae by a periosteal elevator Gauze pads stuffed firmly into the wound and left for three minutes will give a dry field When the pads are removed and the muscles well retracted there are exposed the lateral surfaces of the spinous processes

and the dorsal surfaces of the laminae as far outward as the articular processes

With a Doyen saw the laminae are divided at their junction with the bases of the spinous processes, the line of section passing somewhat downward and inward (in the operating position) Another line of section is made well out toward the articular processes and is slanting like the preceding one (Figs 5, 6 and 7) The laminae vary in thickness in different parts of the spine, being thinnest in the cervical region, then increasingly thick downward through the dorsal and lumbar regions to the sacral region where they are as thin as in the cervical region (3 to 8 mm) The saw has a guard by which the depth of the saw-line may be controlled Moderate experience, however, teaches one to determine by the feel of the unguarded saw when it has divided the bone This may seem a hazardous method, but the considerable fat layer surrounding the dura and the volume of spinal fluid within the dura eliminate any real danger to the cord if the saw is handled with nicety Hemorrhage has not been a factor in the cases so far done

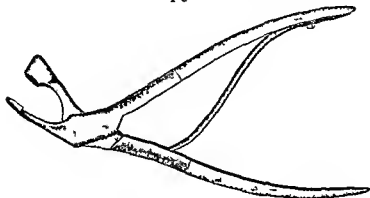
After the sawing is completed, a thin periosteal elevator is slipped beneath the lowest lamina which is raised sufficiently for a bone forceps to grasp and remove it, care always being used not to tilt the fragments so as to endanger the cord The remaining laminae are lifted out with the forceps

In cases where only a small exposure is needed, one lamina may be removed by the use of the saw, and the remaining ones cut away with special rongeurs (Figs 1, 2, and 3) This method does not give so advantageous an exposure for the exploration of the other side of the canal, because so favorable a slant at the base of the spinous process cannot be obtained with the rongeur

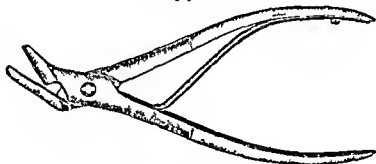
After removing the laminae, the extradural layer of fat and veins is divided longitudinally in the middle of the wound, which is then gently packed with gauze to stop bleeding After a few minutes the gauze is removed and the shiny dura is exposed in the bottom of the wound (Fig 8)

The dura is divided longitudinally. First a short slit is made with a pointed knife to let the spinal fluid which spurts

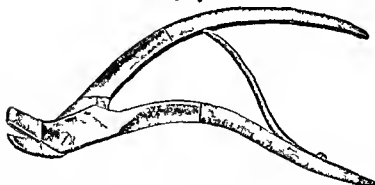
F 2



F 6



F 3



out escape slowly. The division of the dura is completed with scissors exposing the cord and nerve roots for whatever surgical attack is contemplated. Afterward the dura is closed

with a continuous catgut suture, the muscles are sutured to the interspinous tissues with chromic gut, the aponeurosis is closed with chromic gut, and the skin with silk

No drainage is used A firm sterile dressing is fastened by adhesive straps and a bandage The patient lies mostly upon the sides or face during the healing process

The exposure obtained by this method varies in width with the portion of spine involved In the adult cadaver the following spaces were obtained midcervical, $1\frac{3}{4}$ cm, middorsal, 1 cm, midlumbar, 1.3 cm or even $1\frac{1}{2}$ cm, by encroaching somewhat on the articular processes, midsacral, $1\frac{1}{2}$ cm

This approach permits the resection of the nerve roots on both sides of the cord without injury to the cord substance This I have done upon the cadaver many times, and once upon the living subject, in the middorsal region

In the region of the cauda equina it would be possible to anastomose motor roots of opposite sides

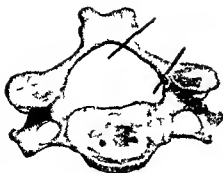
In tumors of the cord this method gives an admirable exploratory approach In many cases, I feel sure, there would be ample room for the removal of the tumor without further destruction of bone With a large tumor, this method, by exposing its exact size and location would enable the operator to remove just enough of the opposite laminae for the easy extirpation of the tumor, and would thus minimize the loss of bony protection to the spinal cord

This approach would almost certainly prevent the mishap reported in two cases by Dr Joseph Fraenkel at the November meeting of this society, where the usual bilateral laminectomy failed to expose cord tumors which were found at autopsy to lie on the anterior aspect of the cord

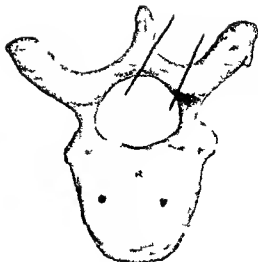
In unilateral laminectomy the side of the cord is well exposed and its anterior surface may readily be explored without injury to the cord substance (Figs 8 and 9)

When the wound is completely sutured, the spinous processes are in their normal positions, there is no visible or palpable deformity of the back, and, because of the thick muscle pad overlying the laminae, no form of examination, other than

1 5

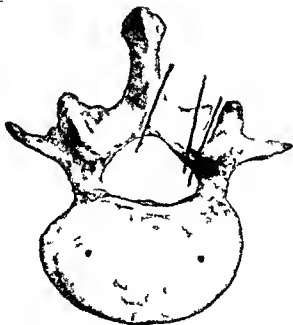


P rtherv l t b



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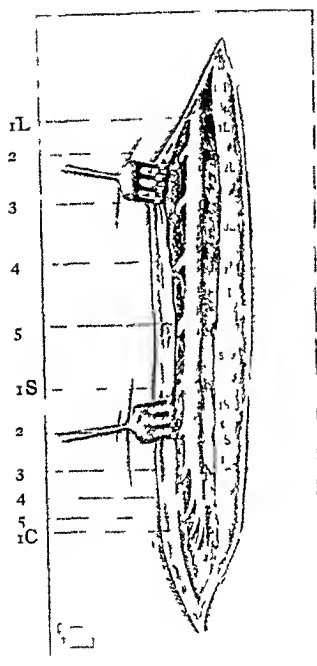
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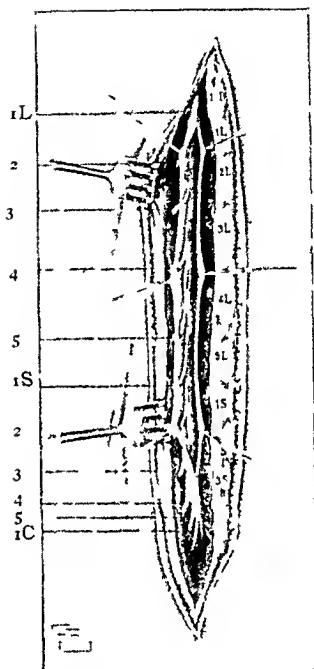
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FIG 8



Drawing from a dissection showing unilateral laminectomy in the lumbar and sacral vertebrae. In this case the articular processes were encrached upon as in the outer line of section Fig. 7. The spines of the vertebrae are numbered on the right and the nerve roots on the left in the drawing. The artist has placed the roots a little too high to correspond properly with the spinous processes. The free view of the cord and the ease of exploring its lateral and anterior aspects is evident.

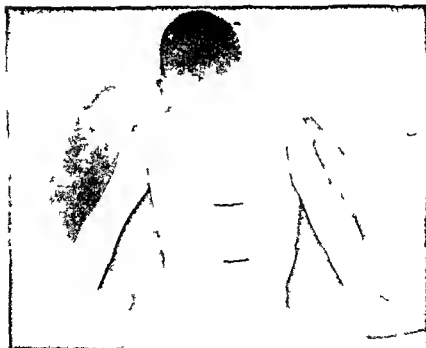
FIG 9



Same as Fig. 8 with the dura opened longitudinally. The same remarks apply to the relations of the roots to the spinous processes. Also the lower end of the cord itself should show at the level of the second lumbar spinous process. The cauda equina is easy to manipulate because of the length of its component bundles.



F



h C sell B s h s ry 11 Three m h af r m -F gur d k
m k 1 1 pe fl b l y r p Th l m r m d l be ee th k
h d rsal l h ly

FIG 13



FIG 14



Case III Boy, 17 years old Eleven days after operation—Figures 13 and 14 show the postoperative flexibility of the spine The laminae removed are indicated by the ink marks

the X ray can determine the loss of bone. The cord therefore suffers practically no loss of protection.

In all of the cases so far done (five in number) there has been little or no shock; primary union has resulted and there has been no loss of flexibility of the spine (Figs 10 to 14 inclusive).

Much has been said of the dangers of allowing the spinal fluid to escape. In these cases it has escaped freely (6 to 12 ounces in different cases estimated) and yet there has been little or no shock and convalescence has been uneventful so that the causes of the complications reported should perhaps be sought for elsewhere.

Systematic records of blood pressure, pulse and respiration during operation have not been kept. At the last operation Dr. Creevey noted that when the dura was first opened and the spinal fluid spurted out there were one or two deep respirations after which the breathing continued as before. There was no change in the pulse.

The neurological results in these cases will be reported at a later time by the neurologists for whom the operations were done.

The advantages of unilateral laminectomy are believed to be: Minimum loss of blood and of bone and therefore minimum loss of bony protection to the cord. No postoperative deformity of the back or loss of flexibility of the spine. Exposure sufficient for all exploratory work except in certain cases of fracture of the spine; for all nerve root work on one or both sides; for the removal of many tumors; and for minimizing the operative trauma in others by first exposing their exact size and location. Exposure such as to diminish the chance of overlooking an anterior tumor.

DEFORMITIES OF THE RENAL PELVIS *

BY W F BRAASCH, M D,

OF ROCHESTER, MINNESOTA,

Physician to St Mary's Hospital

DURING the past year my attention had been called repeatedly to the fact that moderate dilatation of the renal pelvis occurred in conditions other than hydronephrosis, furthermore, that the ureteral catheter could meet with obstruction in the pelvis without a stone being present. Both these data were acquired with the aid of the ureteral catheter in various pathological renal conditions, more often with hypernephromata. Most of the hypernephromata removed in the clinic at St Mary's Hospital showed on section marked deformity of the renal pelvis, either irregular dilatation of the pelvis, entire or in part, or encroachment upon the pelvic lumen by projections of the surrounding tumor substance. It occurred to me that a radiographic demonstration of these deformities could be of considerable aid in the diagnosis of hypernephromata, frequently so difficult to establish clinically. Our first plates were made last spring. A weak solution of argyrol was injected through the ureteral catheter into the renal pelvis and the radiograph made. These plates were not very satisfactory.

Upon investigation it was found that Prof Voelcker of Heidelberg had made a radiographic demonstration of the outline of the renal pelvis over two years ago, using collargol as the injected medium. He had demonstrated several cases of hydronephrosis in this manner and suggested further possibilities of this method as an aid to renal diagnosis.

Using a 10 per cent solution of collargol as the injected medium in subsequent radiographs, we were able to outline the pelvis quite definitely. The radiographs (Plates 1 to 18, page

* Read by invitation, before the Society of Clinical Surgery, Rochester, Minnesota, Oct 30, 1909

540) will illustrate some of the pelvic deformities and associated data which we have demonstrated by this method

1 *The Normal Pelvis*—Variations will be considerable in the normal outline. The number, depth, breadth and contour of the calyces will vary greatly. The extent to which the free wall of the pelvis will distend beyond the kidney border will differ; nevertheless there are limits to which the normal outline is confined.

PLATE 1—The radiograph shows the outline of a renal pelvis in a post mortem specimen. It is necessarily more clearly defined than if the kidney had been in the living subject. That the free wall does not give way more is probably to be explained by post mortem tissue changes. Why the renal pelvis at post mortem usually shows a cubic content of from 2 to 5 c.c. whereas in the living it is often found to hold as much as 20 c.c. or more may be explained by these post mortem changes.

PLATE 2—This is the outline of a normal renal pelvis. The several calyces and rounded papillæ between are clearly outlined. The free wall is seen bulging moderately and tapering into the upper part of the ureter which is shown as far down as the collum uretericum. At this point of narrowing the collargol is usually prevented from running back alongside the catheter.

PLATE 3—This plate shows the normal outline of a pelvis in a floating kidney. The pelvis contained 18 c.c. of injected fluid before artificial renal colic was produced. The patient was aware that the kidney was moveable and complained of more or less pain in that side. The ureter is clearly outlined by the collargol within the ureteral catheter and shows no evidence of a kink. There is no return flow alongside the catheter otherwise it would be shown in the plate.

PLATE 4—Here again is shown the outline of a normal pelvis which might be mistaken for that of a small hydronephrosis. Its actual size may be slightly exaggerated by the kidney moving with the respiration of the patient. The seeming detached shadows of the calyces is a peculiarity sometimes found. The plate shows in a striking manner the return flow along the side of the catheter.

PLATE 5—This also shows the outline of a normal pelvis which contained 20 c.c. It is of interest in that it shows the extent to which the free wall can bulge without a hydronephrosis being present.

2 *Hydronephrosis*—Heretofore in demonstrating surgical dilatations of the renal pelvis we have employed the method introduced by Kelly, i.e. determining the amount of fluid injected into the pelvis necessary to produce renal colic. If correctly employed this method should rarely permit of error.

However, in small dilatations and with impassible ureteral obstructions there may be doubt in some cases. Again, unless familiar with the technic one might interpret the findings falsely. Furthermore, to have a condition unmistakably outlined "in black and white," as shown in the following plates, is a source of satisfaction.

PLATE 6—Here the pelvic outline is very evidently larger and more irregular than that of the normal pelvis previously shown. This is the pelvis of a small hydronephrosis holding about 50 cc.

PLATE 7—This plate shows a larger though still moderate dilatation containing about 20 cc. The sac is pyramidal and is made of the dilated pelvis at the base tapering into the dilated first part of the ureter. This is due to the fact that the ureteral constriction is at some distance below the pelvis, in this case an anomalous blood-vessel.

PLATE 8—Here a rather large dilatation containing 150 cc. is demonstrated. The sac is seen bulging out beyond the outline of the kidney. The calyces are seen shallow and broad, as is usual in hydronephrosis, unless inflammatory changes intervene.

PLATE 9—A still larger dilatation is seen, occupying the left upper abdominal quadrant. All vestiges of the calyces and pyramids are destroyed.

PLATE 10—This is an extreme dilatation filling the left abdomen. On operation an immense fluid-filled sac with but a rim of functionless cortex was found.

3 *Etiological Factors*—In several of the plates etiological factors in the dilatation were quite clearly shown. Referring back to Plate 6, it will be seen that opposite the shadow of the renal pelvis is a marked scoliosis involving the second lumbar vertebra. That scoliosis may indirectly be an etiological factor in hydronephrosis has been previously suggested*. At operation, a band of tissue, the evident result of some paravertebral inflammatory process, was found to be constricting the ureter and causing pelvic dilatation. Anomalous renal blood-vessels usually constrict the ureter near the level of the lower pole of the kidney, into which they pass. As a result one would expect an elongated or pear-shaped dilatation. This is clearly demonstrated in Plate 7, where such a vessel was the direct cause.

* Israel Chirurgische Klinik der nieren Krankheiten

PLATE 11—The outline of this dilatation will be found to differ considerably from the general type of those preceding. It is seen to be less rounded and is very irregular with several small detached shadows. This pelvis is a tuberculous hydronephrosis and is typical of an inflammatory dilatation.

PLATE 12—While not exactly relevant to the subject the plate illustrates a ready source of error in radiographic diagnosis. It is to be inferred here that the wire stilette is in direct line with an ureteral stone. A hydronephrosis on the same side having been previously demonstrated by fluid measurement renders the inference still more favorable. However on referring back to Plate 9 no evidence of a dilated ureter is to be seen. The rounded hydronephrotic sac is seen extending abruptly from the normal calibred ureter. This would be inconsistent were the stone the cause. At operation no evidence of a ureteral stone was found.

4 *Hypernephromata*—Of the 30 hypernephromata removed in the clinic at St. Mary's Hospital nearly all show more or less deformity of the renal pelvis. We have been able to demonstrate this deformity clinically in three collargol plates. The surrounding neoplasm may cause either necrosis or diminution in the size of the pelvis. The dilatation is due in the first place to retraction of the walls of the pelvis by the surrounding tumor. This is clearly demonstrated in Plate 13. The pelvis will be seen to be cylindrical and abnormally broad at the ureteropelvic juncture. The infundibula will be seen short and broad. The removed kidney showed changes in the pelvic outline exactly corresponding to those seen in the collargol plate. The pelvic dilatation may be confined to a single calyx drawing it out into abdominal lengths as shown in Plate 14. Again the dilatation may be due to secondary degeneration of the surrounding tumor with consequent sacculation of the pelvic walls as seen in several of our specimens. If however the neoplasm encroaches upon the pelvic lumen marked diminution in size and content may result. Frequently but a small space is left of the former pelvis. In one of our plates it is shown as a small and irregular area at the end of the ureter. The plate is however so dim that the shadow could not unfortunately be clearly reproduced in a print. In several of our specimens a tongue of the tumor extends into the pelvic lumen reaching even to the ureteropelvic juncture. In such cases a wedge like shadow should be cast between the

lateral collargol streaks How often the pelvic deformity accompanying hypernephromata can be definitely shown in collargol plates remains to be seen It is, however, significant that in the three hypernephromata so far radiographed by us, the abnormality was demonstrated in all

5 *Solitary Kidney*

PLATE 15—This plate shows the pelvis of a solitary kidney The patient presented herself with symptoms of gall-stones On examination a tumor was palpated in the right upper abdomen which was regarded as an enlarged kidney Cystoscopic examination showed urine from the right side only Thirty c.c. of collargol solution were injected into the pelvis before causing any pain The collargol plate shows a pelvis about the normal size Although abnormally large, the pelvis shows a normal contour, the papillæ are not flattened nor are the calyces wider, as in a hydronephrosis The plate makes the diagnosis of a single hypertrophied kidney quite evident The patient was operated upon for gall-stones and on exploration the kidney diagnosis was confirmed

6 *Localization of Renal Stone*—Frequently a shadow is seen in the region of the kidney and its exact relation to the pelvis is in doubt If the stone is within the pelvis its shadow will be either obliterated in a collargol plate, or it will appear dimmed by the surrounding collargol shadow If the shadow is shown to be distinct from the pelvis, in a collargol plate, the stone must be without the pelvis Its relative position in the cortex may then be inferred, particularly if the shadow of the kidney can be brought out in the plate

PLATE 16—This gives the dense shadow of a large stone showing the paler collargol shadow It is thus necessarily located in the pelvis The pelvis is seen to be greatly dilated and irregular

7 *Hydro-ureter*

PLATE 16—This plate also demonstrates the possibility of ascertaining the condition of the ureter Ureteral cathetization in this case showed obstruction in the ureter just beyond the meatus This was passed with difficulty and a dilatation above was suspected from the ease with which the catheter slipped up beyond Injected collargol shows the widely dilated ureter as seen in the plate The dilatation is seen to extend up as far as the collum uretericum, thence the ureter narrows tortuously to the dilated pelvis Unfortunately the plate does not show

the dilated portion of the ureter which on operation was found extending down to the bladder. Quite frequently that portion of the ureter above a ureteral stone will be found at operation to be dilated. This can often be demonstrated in a collargol plate and may be valuable evidence in proving the existence of an obstruction which the unaided radiograph does not show.

8 *Essential Hæmaturia*—Renal hemorrhage is a very perplexing condition to deal with. The radiograph being negative we must still consider the possible presence of a surgical condition. Pelvic deformities other than those accompanying hypernephromata may exist when caused by pelvic papillomata and angiomas. Varicose contracted conditions of the pelvic wall and occasionally cystic kidneys. These deformities may frequently be suggested by collargol radiographs.

PLATE 17—This is the radiograph of a pelvis in a case of essential clinical hæmaturia. The hæmorrhagic urine was seen on cystoscopic examination exuding from the affected meatus. The pelvis is irregular and quite different in outline from the normal pelvis. One calyx is seen to extend upward abnormally as a long thin crevice. Unfortunately the man was not operated upon.

PLATE 18—This shows the pelvis taken in another case of essential hæmaturia. The pelvis appears quite normal in outline. Nothing in the patient's history seemed to warrant an exploratory operation.

9 *Tumor Differentiation*—It is common experience to meet with abdominal tumors whose clinical identification is difficult. Large pancreatic and ovarian cysts, intestinal, gall bladder and stomach tumors and various perirenal growths with indefinite histories may be easily confused with renal conditions. In such cases if a collargol radiograph is made and the renal pelvis is found to be in the *normal position* and with a *normal outline* the tumor is probably not renal. On the other hand renal tumors may be so low as to simulate tumors of the neighboring organs. It will be remembered that in Plate 11 a pyonephrosis was demonstrated. The patient in this case presented an abdominal tumor so low as to lead us to suspect it to be in the cecum. The clinical history also supported this supposition even though cystoscopic examination showed pus from that side. The collargol plate how

ever shows the pelvis to be unusually low and corresponding to the tumor felt

In presenting these plates I realize that the possibilities of the method have not been fully developed Furthermore, that it remains to be seen how often the method will prove to be of practical diagnostic value That it is of value in some conditions is evident from the accompanying radiographs It is also self-evident that much of the success of the method will depend upon the excellence of the radiograph The accompanying prints scarcely do justice to the radiographs from which they were made The original plates were made by Dr V J Willey

PLATE



PLATE 2

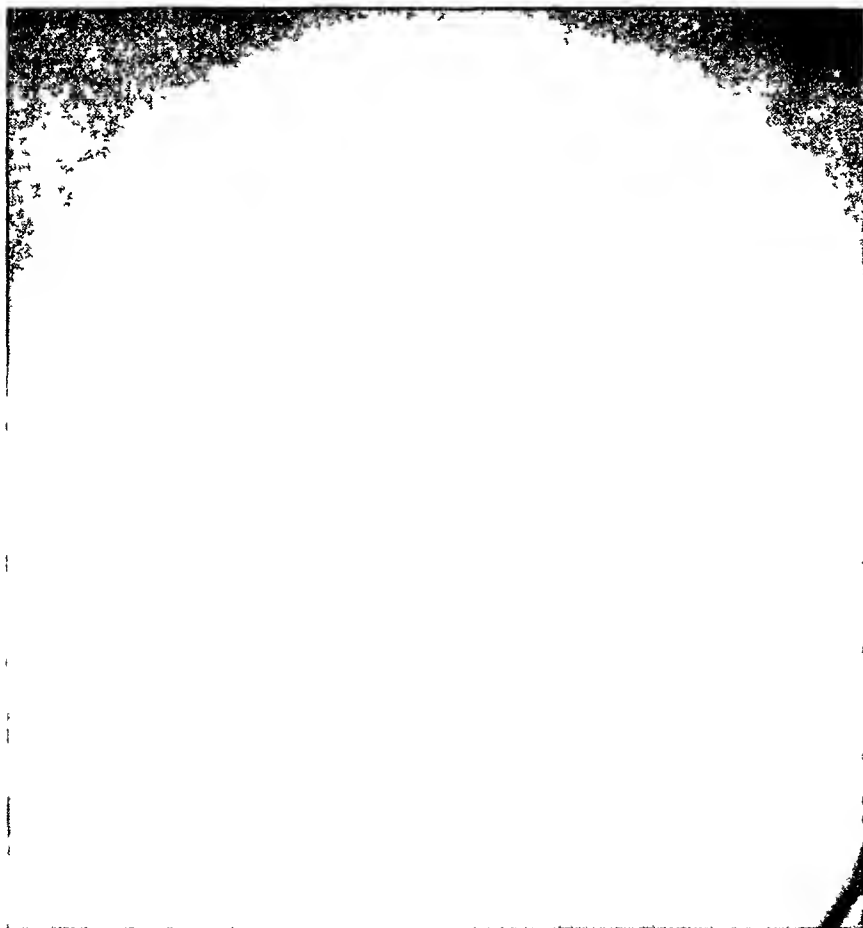


PLATE 3



PLATE 4

1843

PLATE 5



PLATE 6

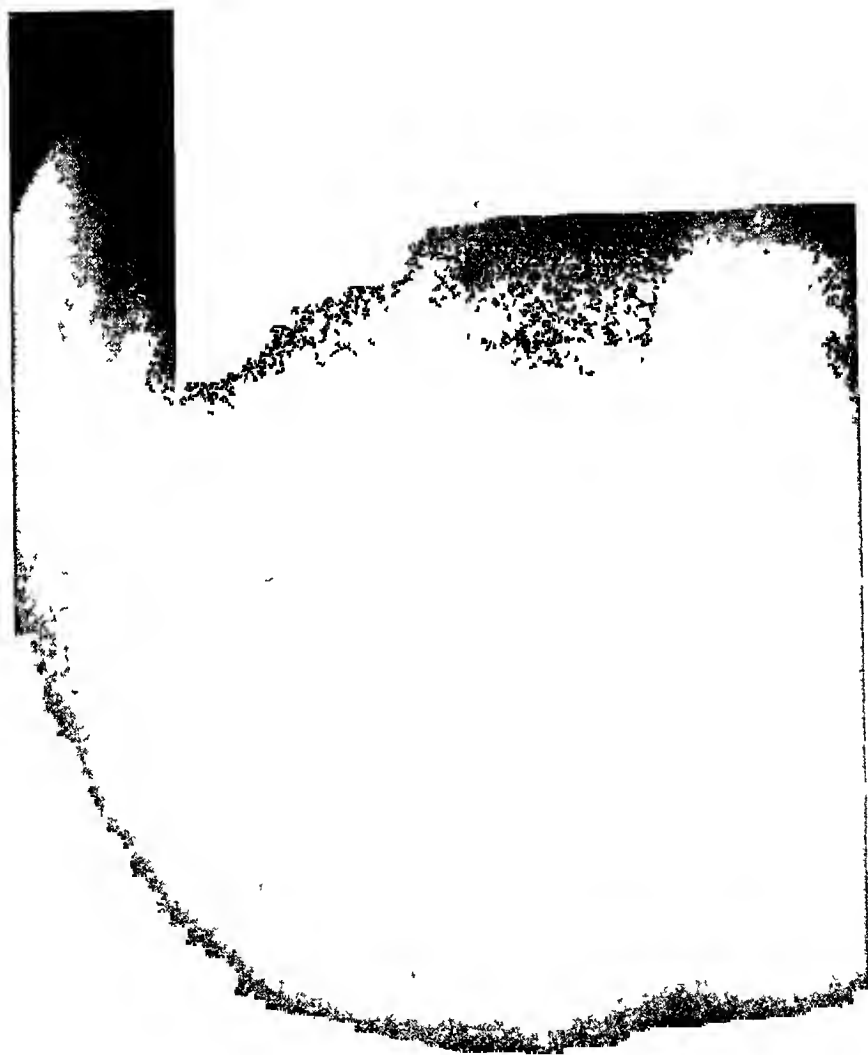


PLATE 7

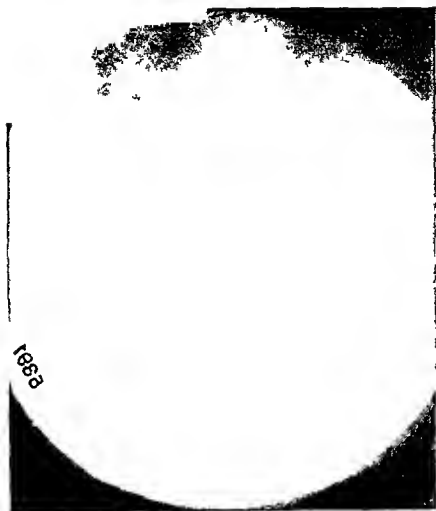


PLATE 8



1083

PLATE 9



PLATE 10



8802



PLATE

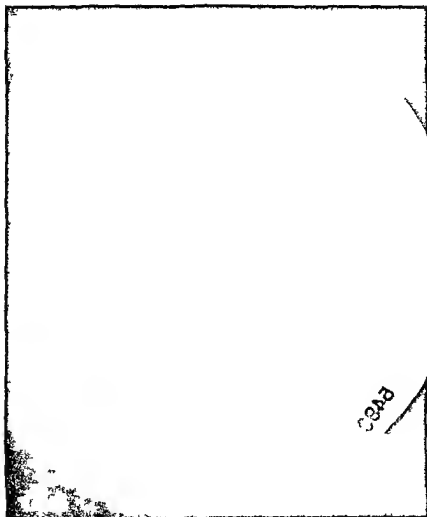


PLATE 12

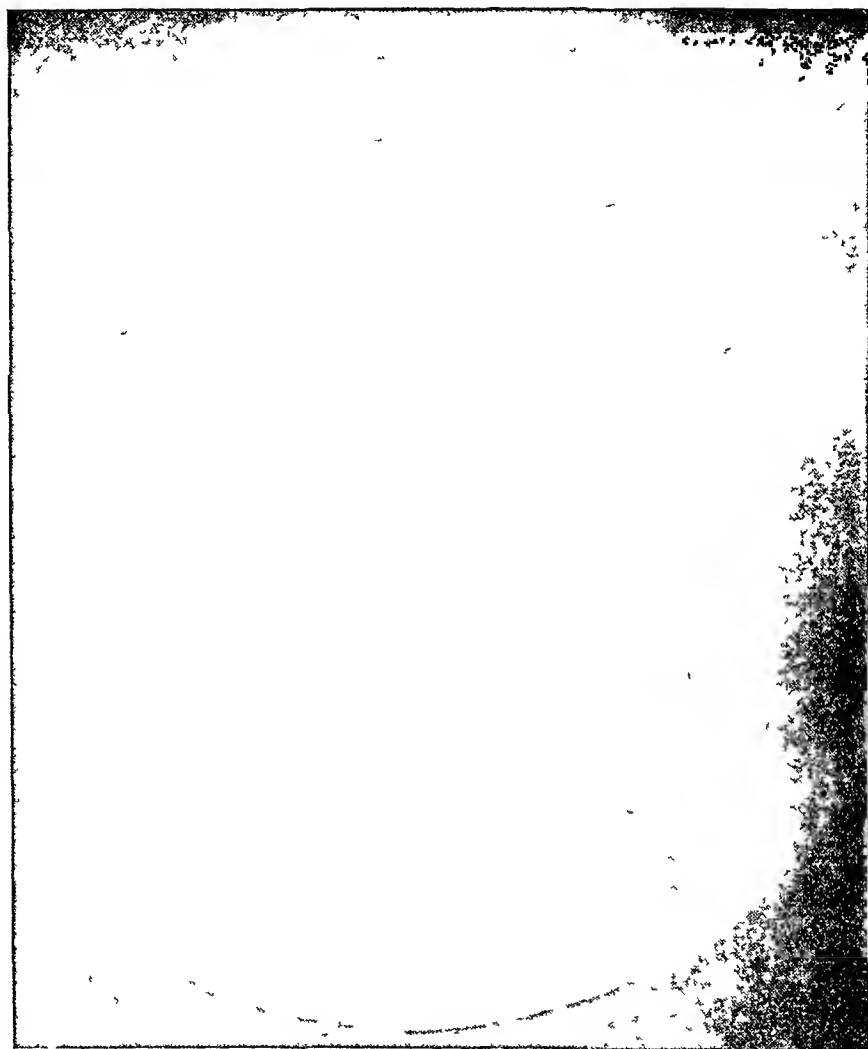


PLATE 3

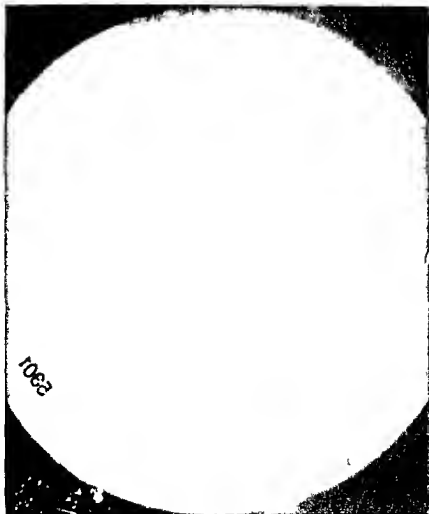


PLATE 14

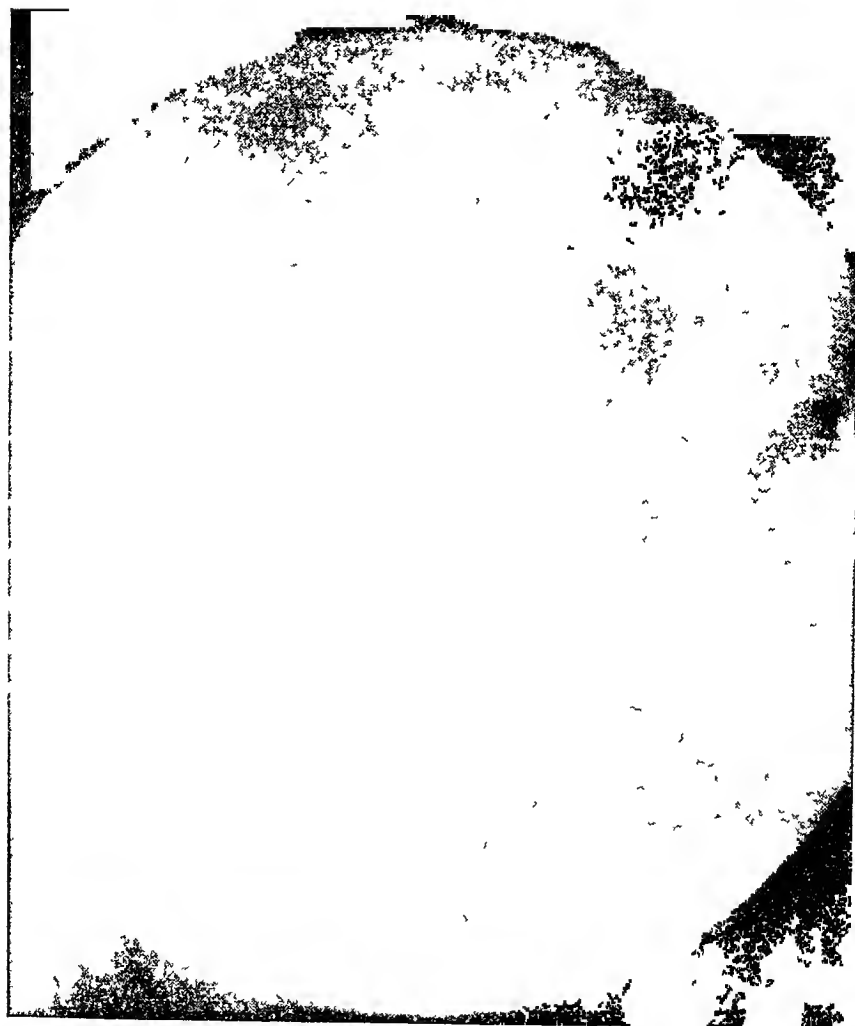


PLATE 5



PLATE 16



PLATE 7

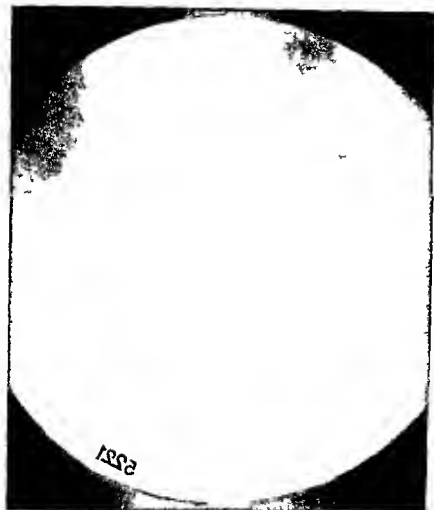
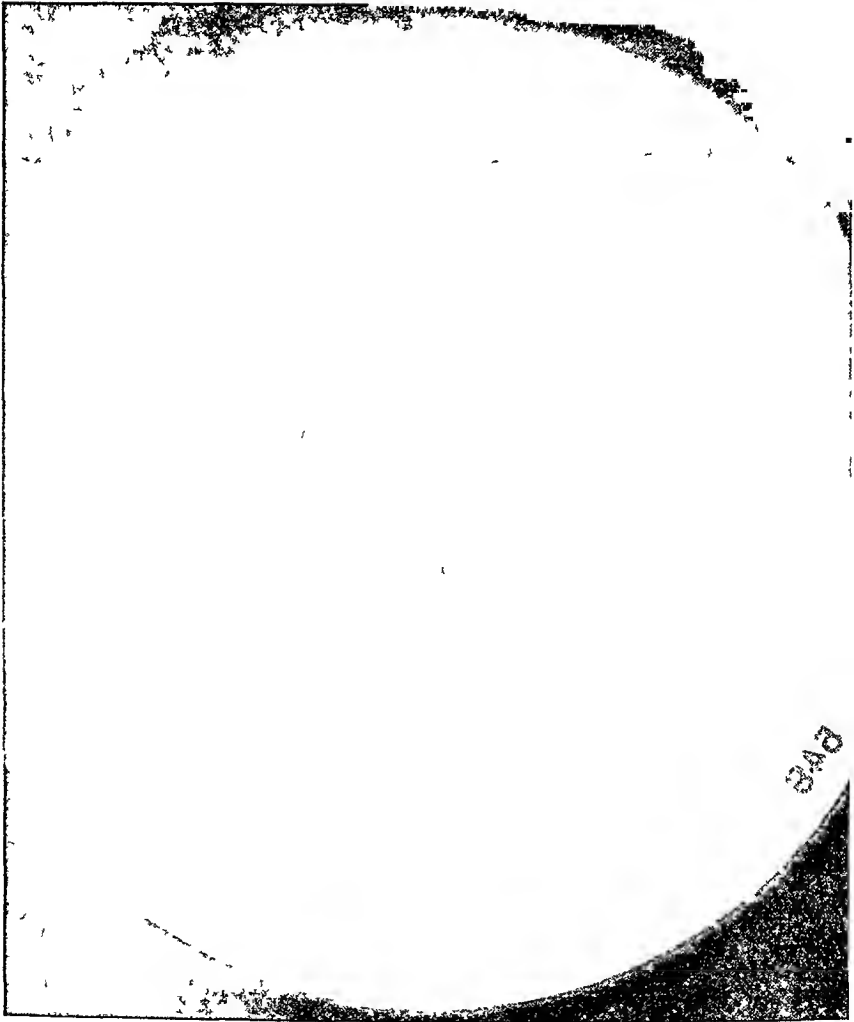


PLATE 18



ANGIOMA OF PAPILLÆ OF THE KIDNEY

REPORT OF THREE CASES OF PERSISTENT HÆMATURIA RELIEVED BY
CONSERVATIVE OPERATION

BY GRANVILLE MACGOWAN M D

OF LOS ANGELES CAL.

My attention was first called to this condition as a source of continuous and very exhaustive painless hæmaturia by the report of Hurry Fenwick in *Obscure Diseases of the Kidney* 1903 of six analogous cases. I have adopted a different and it seems to me more precise method of operating. In his first two cases he opened the pelvis of the kidney and having the good fortune to find the diseased papilla presenting removed it with a curette and thus effected a cure. In the third and sixth cases nephrectomy was resorted to and in all probability the organ could have been saved in both of these if the procedure followed by me had been adopted. In the fourth and fifth cases the condition existed by inference only as the pelvis was not opened and the operation consisted of a partial splitting of the kidney tissue in the lower pole and rather rough handling of the parts over the pelvis by the end of the finger—so that truly the report includes only two cases in which the condition was actually known to exist before the organ was removed and in which a conservative operation was curative.

The only case of a similar nature I can find reported in this country is one by Hugh Cabot in the *American Journal of Medical Sciences* for January 1909 and in this case nephrectomy also was resorted to.

The very interesting article by Pilcher *ANNALS OF SURGERY* May 1909 deals rather with general renal varix than with the condition reported by Fenwick and myself.

In all three of my cases it will be noticed that the dis

eased papillæ were in the upper pole of the kidney. In Fenwick's three they were in the lower pole, and from the procedure adopted in Cases IV and V he evidently thought that this was the only part of the kidney in which they might occur.

Hæmorrhage from a kidney which is not the subject of chronic inflammatory change, and where therefore the pedicle is normal, is easily controlled by the pressure of a soft rubber catheter tied moderately tightly about the blood vessels,—and the splitting of the organ with a long, broad, sharp knife is neither difficult or dangerous. Opening the pelvis the whole length of the kidney is the only way in which a full inspection of the entire organ may be obtained. The closure of the pelvis and bringing together of the two cut surfaces of kidney tissue is not difficult and the results of these three cases in my hands have been entirely satisfactory, saving—in each instance—an organ which it would otherwise have been necessary to sacrifice. I therefore feel that I can recommend this procedure to others.

I was directly stimulated to this publication by the article of Dr. Cabot, and expect that my experience has not been unique in America.

I am far from being able to offer an explanation of the origin of this condition. The ureters were catheterized in two of these cases before operating, without benefit to the hæmorrhage. I do not believe that injection of adrenalin into the renal pelvis could in any of them have given more than temporary relief, for the pathological condition present is well shown in the illustrations accompanying the reports of Fenwick and Cabot.

CASE I (August 17, 1904)—J. W. E., age 48, married. An active business man. Had a mild attack of gonorrhœa at 40. Health has been good until four months ago when he began to have a feeling of lameness across the back and a dragging sensation in the left loin. Coincidentally he noticed his urine was tinged with blood. The hæmaturia has steadily increased and there have been a number of attacks of kidney colic coinciding with the

passage of long strings of blood clot but none of them have been excessively severe

Urine acid specific gravity 1020 contains much blood and some pus. Endoscopic examination shows the urethra to be healthy. Cystoscopic examination mucous membrane of the bladder healthy both ureteral mouths somewhat larger than usual the left crater like and from this comes blood stained urine. Urine from the right ureter normal. X-ray photograph of the left kidney and ureter shows an indefinite shadow in the lower pole of the kidney.

August 20 1904 Nephrotomy through a posterior incision. The organ was freed with a little difficulty as there was some adhesion at the upper pole. It was a rather large and good looking kidney. Knowing from experience how utterly useless the procedure of needling a kidney is I made a careful section of it extending through both poles and laying open all the calices. In the lowest calyx which was opened first a few grains of very fine sand were found and there were a few also in the ureter but the mucous membrane was not eroded or ulcerated and did not bleed. In the upper calyx there was one pyramid which was dark red almost purple from which blood oozed continuously. Its surface was not eroded and there were no granulations upon it. It differed only from the other pyramids by the epithelium seeming to have lost its natural sheen and by the whole pyramid having the appearance of a *stauungshyperæmie*. As this was evidently the source of the hemorrhage and seeing no other way to stop it I cut out the pyramid with a wedge shaped incision and brought the edges together with two layers of catgut. The kidney was closed with two layers of mattress sutures and a continuous suture for the capsule. The wound was drained. Recovery was slow but complete. The delay was occasioned by inexperience. I used chromicized catgut to bring the cut edges of the pyramid together and for the mattress sutures also tying one of the first row of the latter directly over the former suture to obtain more pressure. The result was a slough which it took four weeks to separate and four more to heal.

The man has remained well ever since. Microscopical examination of this piece of kidney showed nothing but hyperplasia of the blood vessels.

CASE II (January 29 1907) —O A C 45 years old printer

patient of Dr Hamman Two weeks previous he was attacked with a symptomless hæmaturia, which has been continuous and extremely severe Cystoscopic examination shows a healthy bladder, and emission of blood from the left ureter

January 21 Examination of the kidney and ureter through an S-shaped incision in the loin As no clots could be seen coming down the ureter when it was rolled up on the peritoneum, it was opened and explored toward the bladder while a small catheter was passed up to the pelvis of the kidney No obstruction was felt in the pelvic part of the ureter and the water used to flush the tube was not stained with blood as it issued from the catheter in the bladder A very few drops of blood came from the catheter in the kidney The kidney was brought out upon the side, split open from pole to pole and its calices with its pyramids examined closely Everything was normal except a portion of one papilla in the upper pole, this was dark purple in color and bled continuously It was removed by a wedge-shaped incision, the sides were united by one stitch of fine catgut The incision in the ureter was closed over a catheter which was withdrawn through the pelvis of the kidney The mucous membrane of the pelvis was approximated by a few fine interrupted catgut sutures, the two sides of the kidney were brought together with a double row of mattress sutures, tied loosely, and the wound drained by two ample cigarette drains which were withdrawn in two and four days respectively Recovery uneventful and complete, he is now well

CASE III (August 21, 1908) —Mrs C, 39 years old, married, sent to me by Dr Sheppard of The Needles, Cal

She is a small woman who normally weighs about 130 pounds Up to the latter part of March, 1908, she has always been robust During an illness of her husband she strained her back in lifting him, and had to lie abed four days Then she became constipated and has remained so At intervals she has had some burning pain over the bladder vault, and the passage of urine has been at times painful During the second week in May, a painless and profuse hæmaturia commenced and has continued ever since Her appetite failed She has lost fifty pounds in weight She is very pale and not able to work There is no history of tuberculosis and her heart and lungs are healthy

August 24, 1908 Cystoscopic examination Bladder healthy

Bloody urine comes in jets from the left kidney August 25 Right ureter catheterized Specimen obtained acid specific gravity 1010 contained a trace of albumin but no blood or pus This examination was followed by great pain and prostration

August 27 Left ureter catheterized and pelvis of kidney irrigated with decinormal salt solution This was followed by severe colic which lasted for six hours Examination of specimen of urine for T B negative

A blood count showed a rather marked grade of simple anemia It was thought best to attempt to control the hemorrhage medically Peptomanganate of iron hamamelis ergot and adrenalin and calcium chloride were all used Her strength improved by the rest which lasted until early in October Her weight had fallen to 113½ pounds and the hemorrhage continued uninfluenced and unabated

October 5 Nephrotomy The kidney was lifted out upon the back and appeared to be normal I then incised it carefully from pole to pole opening the entire pelvis and exposing all of the calices successively examining each papilla carefully The two last papillæ at the upper end of the upper pole were seen to be covered with a moss like membrane which bled continuously just as water seeps through the cemented surface of a tunnel back of which lies a spring I cut out both of these papillæ with wedge shaped incisions and endeavored to draw the edges together with No 00 catgut with a needle of corresponding fineness but the kidney substance was too friable and so I burned the raw base of both wounds lightly with an electric cautery The mucous membrane of the entire pelvis was united by a continuous suture of fine catgut The two cut surfaces of the kidney were united by two layers of mattress sutures and the capsule sewed up with a continuous suture of fine catgut There was very little bleeding A cigarette drain was left in the wound for three days when there being no further escape of urine the drain was removed She left the hospital healed and well on October 22 There has never been any hæmaturia from the time of operation The woman is well and weighs now 130 pounds

Report of the pathologist Dr Leonard — The specimen submitted proves to be an increase in the fibrous tissue elements of the papillæ The collecting tubules are greatly dilated and desquamation of the lining epithelium marked The blood vessels are engorged and dilated and their walls thinned

COMBINED CYSTOSCOPIC AND RONTGENO- GRAPHIC EXAMINATION OF THE KIDNEYS AND URETER

BY ALEXANDER A UHLE, M D, GEORGE E PFAHLER, M D,
WILLIAM H MACKINNEY, M D, and ALBERT G
MILLER, M D,
OF PHILADELPHIA

THERE is no group of organs in which methods of precision in diagnosis are more successfully employed than in surgical conditions of the urinary organs. It is indeed surprising what progress has been made in the diagnosis of surgical affections of the kidney, ureter and bladder. The physician who avails himself of the knowledge obtained from a systematic employment of these methods approaches his work with a more accurate knowledge of the pathological conditions and surgical indications than is obtainable in any other field of abdominal surgery.

The chief methods of precision used in the diagnosis of the surgical affections of these organs are the X-ray, the cystoscope and ureteral catheterization.

The X-ray has its greatest field of usefulness in the diagnosis of calculus of the kidney and ureter. Here there is more than one source of error. In a very small proportion of cases a calculus may exist, and a shadow cannot be discerned, again shadows occurring in the region of the kidney or ureter may be caused by other conditions and consequently be misinterpreted. The shadows which must be differentiated from that of stone are those produced by (1) phleboliths, (2) fecal concretions, (3) enteroliths in the vermiform appendix, (4) calcified costal cartilage, (5) osteoplaques, (6) folds of the intestines, (7) foreign bodies in the intestine (pills, tablets, Murphy button, etc.), (8) calcified arteries,

* Read before the Philadelphia Academy of Surgery, January 3, 1910

(9) calcified lymphatic glands (10) bullets or shot in the muscles of the back (11) prostatic calculi (12) fingermarks on the plates (13) developing errors from an uneven flow of the developer (14) flaws in the plate (15) tubercular kidney (16) calcified myomata (17) extra uterine pregnancy (18) dermoid cyst (19) calcified ovary (20) moles on the skin. Shadows are also obtained in hydronephrosis pyonephrosis and tumor of the kidney but a correct interpretation is usually impossible.

Cystoscopic examination frequently reveals pathological changes which are characteristic of ureteral or kidney disease. The character of the bladder mucosa, the presence of ulceration particularly around the orifices of the ureters, the condition of the ureteral openings themselves, whether elevated, depressed, inflamed, oedematous, etc., together with their functioning characteristics and finally the character of the fluid ejected (clear urine, blood or pus) are valuable data which aid in establishing a diagnosis.

Ureteral catheterization will determine an obstruction in the course of the ureter; the urine collected will give information as regards the presence of abnormal elements such as blood or pus. The manner of the flow will determine to some extent the functional activity of the kidney or the presence of residual urine in the pelvis of the kidney, such as occurs in hydronephrosis or pyonephrosis.

While ureteral catheters will determine the presence of an obstruction, it is frequently impossible to establish the nature of the obstruction. The passage of a catheter may be obstructed by a calculus, a fold of mucous membrane or diverticulum within the ureter, a stricture or twist of the ureter or pressure upon the ureter from without. Attempts have been made to determine the presence of stone by the use of wax tip catheters or catheters fitted with a stylet and stethoscope attachment. These methods are often successfully employed in the female by using the cystoscopic tube, but in the male where more complex instruments are necessary, their use is difficult and uncertain. The X ray furnishes the

most reliable information regarding the presence or absence of stone, but occasionally a mistake in interpretation is possible, because of the confusing shadows mentioned above

It is impossible that any one person can become thoroughly skilled in all methods of examination, and the usual practice of having separate examinations made by the cystoscopist and the Rontgenologist in the diagnosis of surgical conditions of the urinary tract is to be commended, especially as the examination made by one will aid the findings of the other. In many obscure or doubtful cases better results will be obtained by combining the Rontgen examination with ureteral catheterization or exploration, using for this purpose a catheter filled with a substance capable of casting a shadow. To facilitate the examination it is best conducted upon the table of the X-ray laboratory, the picture being taken immediately after the catheters have been introduced.

Catheters suitable for this purpose may be obtained by filling the lumen with bismuth paste, metal stylets or fluids of sufficient density to cast a shadow. Our first examinations were made with catheters filled with 30 per cent bismuth paste. The ends of the catheters were plugged and the paste allowed to dry in the catheter. Flexible lead wire introduced into a catheter gives a more distinct shadow. Both of these catheters are flexible and can be employed without fear of injuring the walls of the ureter, when gently passed. We later found that fluid injected into the pelvis of the kidney for renal diagnosis was of sufficient density to cast a shadow not only of the kidney pelvis, but also the ureter. Where a stone is suspected a more distinct picture is obtained with the lead catheter introduced to the point of obstruction. It is not advisable to withdraw the cystoscope during the X-ray examination, especially if the obstruction exists within three or four inches of the ureteral opening, as manipulation of the instrument may displace the catheter. The site of obstruction can be estimated by graduated catheters or by measuring the distance which the catheter must be withdrawn before it emerges at the ureteral orifice.

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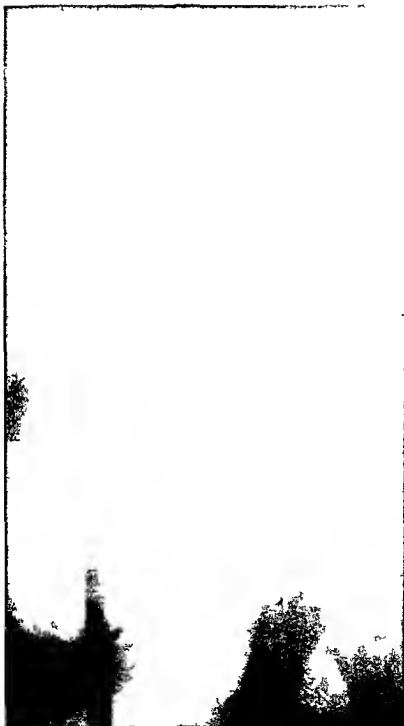
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FIG 3



Shows the normal ureter and pelvis of the kidney injected in a healthy adult with colloidal silver (50 per cent solution)



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RADIOGRAPHIC EXAMINATION OF THE INJECTED KIDNEY
PELVIS

Before resorting to this means of examination in the diagnosis of surgical affections of the kidney numerous fluids of different strengths were X rayed to determine the density of their shadows. The percentages of the fluids were selected in accordance with their physical properties and the strength with which they could be used with safety. Among the solutions employed were emulsion silver iodide 5 per cent novargan 10 per cent silver nitrate 1 per cent collargam 2 per cent and 10 per cent and colloidal silver oxide 5 to 50 per cent. Colloidal silver oxide is a silver salt said to contain 50 per cent of silver sold under the name cargentos. This salt in 50 per cent solution gave the most dense shadow. A further test of this solution was made by injecting it into the ureter and pelvis of the kidney removed at postmortem. Before injecting this salt into the pelvis of the kidney of any patient it was used extensively in urethral and bladder affections and was found nonirritating in 50 per cent strength. The first two patients examined by this means received an injection of warm 20 per cent solution of colloidal silver but the X ray plates were unsatisfactory as the shadows were too indefinite. All the other patients have received an injection of 50 per cent strength.

The solution was injected through an ureteral catheter by means of a syringe of 10 c.c. capacity. Two patients received 10 c.c. each and the solution flowed back into the bladder alongside the catheter. In these patients probably too much solution was used. The quantity of solution employed was subsequently reduced to 5 c.c. which was found satisfactory from a radiographic point of view. The injections were given slowly so as not to cause sudden distention of the kidney pelvis a condition which will provoke renal colic. Injections immediately preceded the taking of the X ray picture. The fluid was allowed to drain from the kidney pelvis before withdrawing the catheter although subsequent experience has shown that this is not necessary.

Two of the patients who received an injection, suffered immediately from renal colic lasting for several hours after the fluid was injected. Both of those patients were highly neurotic and complained of vague urinary symptoms with pain referred to the kidney region, but in whom no evidence of disease could be found. One of these patients received an injection of 10 c c of 20 per cent colloidal silver, the other 8 c c of a 50 per cent solution into the right kidney pelvis with no discomfort, but a few days later, when the left kidney was injected with 4 c c of a 50 per cent solution colic followed immediately. Later experience has convinced us that the colic is not due to any irritating properties of the solution, but to an overdistention of the kidney pelvis.

It is difficult to estimate the capacity of the kidney pelvis and to know how much of the solution should be injected without causing overdistention. The normal average capacity from our investigations is 4 to 6 c c, but in pathological conditions it may be less than this or considerably more than even 200 c c.

To prevent overdistention or the too rapid distention which cannot be controlled with the hand syringe, a difficulty encountered in the first five examinations, we have devised the following technic.

INJECTION OF THE URETERS BY GRAVITY

The buttocks of the patient are elevated and the ureteral catheter is introduced for a distance of about three inches. The warmed solution is allowed to flow by gravity from a graduated burette, which is connected with the ureteral catheter by means of a rubber tubing to which is attached a small cannula. Then with a force of gravity of about two feet the fluid is allowed to flow. The solution flows at times evenly and at other times intermittently, but finally it comes to a standstill, which is taken as an indication of complete filling of the ureter and pelvis of the kidney.

This technic offers an advantage of a natural filling of the kidney pelvis and obviates the danger of overdistention or too

sudden distention. It also gives a possibility of filling a ureter which offers obstruction to the passage of a catheter but in which the obstruction is only partial as is seen by the flow of urine, pus or blood from the ureter before the introduction of the catheter.

By this means we may be able to determine the condition of the ureter such as dilatation or diverticulation above a partial obstruction together with the size of the kidney pelvis.

The fluid can then be easily drained from the ureter by the catheter or it may be allowed to flow into the bladder. An additional quantity of the fluid can then be injected into the bladder and this organ outlined. This is useful in a suspected diverticulation or partial displacement from pressure.

Conclusions that can be made from the examinations thus far conducted are

- 1 Combined X ray examination and ureteral catheterization with catheters filled with substances capable of casting a shadow give more definite information as to the existence of ureteral obstructions than either method alone.

- 2 Doubtful shadows in the region of the ureters caused by conditions other than calculus can be excluded by this means of examination.

- 3 By the use of a warm solution of colloidal silver oxide (50 per cent) a definite shadow of both ureter and kidney pelvis can be obtained.

- 4 This salt is non irritating.

- 5 Renal colic does not occur if the solution is allowed to flow into the renal pelvis under low pressure.

- 6 Colic is probably due to too rapid injection of fluid or overdistention of the kidney pelvis.

- 7 This method of examination determines the size of the kidney pelvis, the amount of destruction of the kidney substance and the position of the kidney in its relation to other structures.

- 8 It also determines the position and alterations in the size and shape of the ureter and the bladder.

THE TREATMENT OF SYPHILIS BY HYPODERMIC INJECTIONS OF SALICYLATE OF MERCURY *

BY MACY BROOKS, M D,
OF PHILADELPHIA

IN treating syphilis we are confronted with two great difficulties First, to keep the patient from blowing his brains out when informed of the nature of his malady, and, second, a much more difficult task, to keep him on regular treatment after all the subjective symptoms have disappeared and he is apparently perfectly well

Is there any wonder that the dispensary and hospital cases proclaim themselves cured and throw away their medicine, when the refined and educated gentleman grows lax, indifferent and intermittent in his treatment and often goes so far as to marry contrary to advice, after a year or a year and a half of spasmodic medication

Any method which by its prompt and rapid relief of all acute secondary symptoms, and by the fact that it makes it necessary for the patient to see the physician every five or ten days, is bound to impress the syphilitic with the importance of the disease and the necessity of regular treatment

Few patients will make visits daily or every second day, as is necessary with the soluble salts, unless there is some subjective symptom which is worrying them, but the majority prefer to receive a hypodermic every five to ten days, as is required in this treatment, to taking medicine three or four times daily for several years, in constant dread of detection, or to rubbing inunctions for twenty minutes once or twice daily and having their clothing and bed linen stained continuously

The injection of the insoluble salicylate of mercury, if performed, as will be explained, is practically a painless pro-

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cedure There is established a medical depot which is continuously dispensing mercury day and night as the tissues gradually change the insoluble salt into a soluble mercury

The physician cannot be misled as to the amount of mercury the patient is getting and the patient cannot become lax in his treatment without the physician knowing it

I was surprised when I first started this method of treatment to find how pleased were all my private patients who had previously been on pills to take it up and continue it

The injections are continued all through the treatment even after the iodide has been started

I believe from what I have seen of this treatment in my own practice and in the wards of the Philadelphia Hospital that it is far superior to any except injections in the hands of an experienced man which is not practical in the vast majority of cases

The rash the headache the angina the osteocopic pains the mucous patch the alopecia and the condylomata rapidly disappear and are seldom seen again if this treatment is continued There have been no relapses in any of my private cases

The solution which is used is composed of mercury salicylate Mercks 1 part liquid alcohol 5 parts One minim of this solution will equal one fifth of a grain of mercury This solution may be placed in one ounce bottles which are corked with sterile cotton and placed in a water bath the temperature gradually being raised to the boiling point and kept there for an hour These bottles may then be corked with sterile corks the necks dipped in paraffine ready to open when needed After once being sterilized the solution appears to remain so

Dr Gottheil told me he had left a bottle of this solution uncorked in his office for several months and after repeated attempts the bacteriologists had been unable to grow a culture from the exposed top of the media.

Liquid alcohol will not become rancid as will the vegetable oils and it is in no way irritating It passes readily through

the needle, yet is heavy enough to hold the mercury in suspension for several minutes. It is unaltered by the regular means of sterilization.

It is advisable to have a special syringe having a long narrow barrel, so that the markings indicating minims are not too close together. With an oily menstruum it is difficult to measure a minim accurately in an ordinary closely marked hypodermic. All parts of the syringe, other than the barrel, should be of metal, so that it shall be as heavy as possible, to facilitate a quick deep puncture with the long needle. The needles vary in length from an inch and a half to an inch and three-quarters, depending upon the thickness of the patient's buttocks. The needles should be made to slip on to the syringe, instead of screwing on, so that the barrel of the syringe may be readily disconnected from the needle without disturbing the point, as is apt to occur when the barrel has to be unscrewed. The needle must have a larger lumen than the ordinary hypodermic needle to permit the passage of an oily fluid, a separate needle is kept for each patient.

The salicylate of mercury has no action on metal except to preserve its lustre and prevent oxydizing.

The best syringe is one designed by Dr. Gottheil, it has a plain metal piston which completely fills the barrel of the syringe, leaving no dead space when at the end of its stroke. The thumb end of the piston terminates in a flattened disk large enough to support the syringe with needle attached in a perpendicular position, so that no contamination may take place after sterilization.

The technic of the injections is very simple. After the syringe has once been sterilized the film of mercury which remains in the barrel keeps it sterile. The needle end of the syringe is wiped off with ether on cotton, it is then passed back and forth through the flame of a spirit lamp, five or six times, so that the solution may not be contaminated. It is now filled with the salicylate of mercury solution, which has previously been well shaken, and the needle being fitted in place is drawn through the flame several times. Care must

be taken not to heat the needle hot enough to take the temper out of it

The syringe now being filled and all air expelled is ready for use. The patient stands in front of the operator in the position of attention feet together body erect and with buttocks relaxed. The skin is sterilized with a pledget of cotton wet with ether. This also chills the skin and renders it anæsthetic. This anæsthesia may be increased by blowing upon the ether moistened skin. When the skin is quite cold the needle is driven home with a rapid stroke into the fullest part of the buttock on a line perpendicular to the intergluteal fold and one inch to one and one half inch external to it.

The syringe is disconnected and the end of the needle watched for twenty seconds. Should the injection fluid start to well out the needle is in a small vein where the vein is large the fluid is followed by drops of blood. In either event the needle must be withdrawn and re inserted. This may be done immediately or should the patient be nervous it may be postponed. When the needle is found to be properly inserted the barrel is again attached and the injection fluid slowly introduced. The needle is then rapidly withdrawn its track closed by rotating the tissues with a pledget of cotton. A square of sterile zinc oxide adhesive plaster is placed over the point of puncture. This may be removed in a few hours. Blood from the seat of puncture after withdrawal of the needle is of no consequence simply indicating that a vein has been injured as the needle passed it. pressure for a moment will stop this. With this form of treatment there is less tendency to salivation and gastro intestinal disturbances and the results are very rapid.

In ordinary cases the headache rash and sore throat disappear after the first or second injection and persistent cases are frequently relieved after three or four hypodermics.

It is well to start with a small dose at first especially in women except when there is a severe lesion requiring drastic measures.

In starting the treatment at the Philadelphia Hospital

there were a number of cases which had been under other treatment for various periods, ranging from a month to eight months, some of which had been very refractory, having stubborn mucous patches and condylomata, most of these cleared up after two or three injections

I have collected data on sixty cases, which I will not report here, except to state that they indicate a decided improvement over the methods previously used at the hospital

Dr Christian and I started this treatment last winter at the Philadelphia Hospital and the other chiefs upon the genito-urinary service have continued it as the routine treatment ever since, which would indicate that they were pleased with their results

The advantages of this form of treatment are as follows

All treatment is administered by the physician, therefore he can readily determine when a patient is neglecting treatment

The history shows the exact amount of mercury the patient is getting, which is very important in determining results, as few patients are regular with treatment by mouth orunctions

A visit every five to ten days to a doctor's office does not arouse suspicion, and it relieves the man of affairs from the fear of detection in constantly taking medicine and the danger of forgetting it

Simplicity of technique—flaming, instead of boiling, being all that is required

The injection, if properly given, is practically painless, causing a slight bruised sensation which usually disappears in twenty-four hours

These points of advantage, coupled with the fact that this method seems to give the most rapid results, even in very stubborn cases, should recommend it to those who have not yet used it

PLASTIC OPERATION FOR THE RELIEF OF AN INCURVATION OF THE PENIS *

BY ORVILLE HORWITZ M D

OF PHILADELPHIA.

P res f G lto-U inary S g ry i th J ff rso Medical C ll g S ge t th
J ff rs Hosp l d th P yl Stat H pit l f th t sa

THE case here cited is unique hence it is believed that a brief description will not prove uninteresting

The patient a man thirty six years of age consulted me in March of the past year for a physical defect of ten years standing that followed an operation performed for stricture of the urethra His recovery from the operation had been uneventful but it was soon after observed that when the organ became erect it was bent at almost a right angle in the median line and was deflected toward the right side The deformity made coition impossible Previous to consulting me he had undergone various treatments at the hands of numerous physicians but had obtained no relief

On inspection the flaccid penis presented a normal appearance Palpation revealed the presence of a fibrous mass one and one half inches long situated on the under surface of the penis at the right side of the urethra The mass appeared to lie between the sheaths of the corpus cavernosum and corpus spongiosum and to be attached to the lateral wall of the canal On introducing a bougie the tube was found to be free from obstruction The position and attachment of the cicatricial tissue made it evident that it could be resected with little or no damage to the body of the organ hence a plastic operation which would in all probability result in benefit if not in cure was deemed justifiable My colleague Dr Loux who saw the case in consultation agreed with my conclusions

The patient was told that his only hope of obtaining relief lay in an operation that would be experimental in character He was further assured that if it was found that the fibrous mass

could not be removed, nothing would be done, but that if we found the conditions favorable, we would proceed with the resection. We impressed upon him the fact that we could promise nothing, that the operation might fail, or might even result in accentuating the deformity. On the other hand, it was explained to him that if the operation proved successful, the result would be most gratifying, and the several functions of the organ would be completely restored.

The patient, an unusually intelligent man, agreed to have an operation performed.

At operation our previous views were confirmed, namely, that the fibrous tissue was interposed between the corpus cavernosum and corpus spongiosum. It was easily resected until the middle of the penile urethra was reached, this being the site at which the stricture had been incised. At this point the scar-tissue formed a part of the urethral canal. Its dissection necessarily resulted in a hole, about the size of the finger-nail, being left in the lateral wall of the urethra. In excising the fibrous tissue in the cavernous structure an incision was made through the sheath, an upper and a lower flap were then formed, thus giving access to the scar-tissue, which, fortunately, involved the body of the organ to only a slight degree, and was easily removed. The lower flap of the sheath of the corpus cavernosum was utilized to close the opening made in the wall of the urethra. The wound was then closed in the usual manner, and perineal drainage established by means of a perineal cystotomy.

Following the operation there was œdema of the penis, which persisted for about four days. The sutures and perineal drain were removed on the eighth day, when the patient left the hospital. When I saw him, about a week later, he stated that when the organ became turgid, the former curve in the median line had almost entirely disappeared, and that there was some slight deflection of the glans penis toward the right side. A month later coition was successfully effected.

In 1898 Otis, of New York, published a valuable contribution to the literature on the subject of stricture of the male urethra. In this work ("Stricture of the Male Urethra and its Radical Cure") he practically assumes that the urethra should be of "uniform calibre," at least as far down as the

triangular ligament He states (*loc cit* p 22) moreover that We may hence affirm as a most important axiom that the slightest encroachment upon the calibre of the urethral canal is sufficient to perpetuate a urethral discharge or even under favoring conditions to establish it *de novo* without venereal contact

These views were received with favor by most surgeons and thus dilating internal urethrotomy became the accepted method of treating cases of chronic anterior urethritis in whom the slightest suspicion of a coarctation of the urethra existed

Otis also devised an ingenious instrument known as a urethrometer which serves to determine the dilatability location and calibre of any constriction that may be present in the anterior urethra This instrument is at present used only in the examination of certain obscure cases In the hands of a surgeon of wide experience in urethral cases and of one skilled in the manipulation of urethral instruments the urethrometer is capable of disclosing valuable information In the hands of those of limited experience in urethral work however it is unreliable and may impart information from which erroneous conclusions regarding the existing local condition of the urethra may be drawn and a mistaken diagnosis made thus the patient may be subjected to a urethrotomy that was not only unnecessary but probably injurious as well

Many years ago Gross in his System of Surgery emphasized the fact that but few physicians can manipulate urethral instruments skilfully This writer goes on to say

To be successful it requires skill of the highest order and an intimate knowledge of the anatomy of the urethra. My conviction is but few men can do it well

It is now well understood that the calibre of the urethra is not uniform but that the tube is made up of a series of physiologic dilatations and contractions Its walls are in contact except during the passage of urine or the emission of semen or when the canal is distended by the introduction of instruments or other foreign bodies

In reality, the urethra is a narrow slit, about eight and one-half inches long, the calibre of which is not fixed, but which, when normal, is capable of great distention, without consequent injury. The extent to which the canal can be dilated with safety varies in different individuals. Many years ago Otis demonstrated that the normal dilatability of the urethra bears practically a constant relation to the circumference of the flaccid penis at the penoscrotal junction.

When operating for the relief of a stricture, the surgeon is not concerned about the calibre of the canal, but aims to restore the normal function of dilatation and contraction to the tube, which function is always interfered with when a stricture exists. This result can be attained only by exercising care when dividing the constricting fibrous tissue that makes up the stricture, and by avoiding, so far as possible, inflicting injury to the healthy tissue in front of, behind, and surrounding the coarctation. If the healthy tissue surrounding the constriction is extensively incised, it will be found, on convalescence, that the normal power of contractibility and dilatability of this portion of the tube is permanently lost, and that a plastic exudate forms in the wounded healthy tissue and may become organized into fibrous tissue, which, in turn, contracts, causing an incurvation of the penis.

In the case previously cited, the instrument that caused the incurvation of the penis was one devised by Otis, and known as the "dilating internal urethrotome." The technic of the method of using this instrument is thus described by the inventor: "The normal dilatability of the urethra is first determined by means of the urethrometer. The urethrotome is then introduced beyond the stricture, and the blade separated up to one or two millimetres beyond the normal calibre of the urethra, in order to make the stricture completely salient, the blade of the instrument is then drawn through the entire mass of cicatricial tissue, severing the stricture completely" (Morrow, "Genito-Urinary Diseases," vol. 1, p. 308).

The wide employment of this method of performing urethrotomy resulted in quite a large number of incurvations being

reported as a late sequel to this operation. My own unfortunate experience with two patients coupled with the fact that incurvation of the penis was not an unusual complication of a dilating internal urethrotomy led me to investigate and finally to discover the cause of this untoward result. Thus I found to be due to overdilatation of the urethra when the stricture was incised. On performing the operation with the canal overdilated it was impossible in some cases to avoid wounding the surrounding healthy tissue which as has previously been pointed out will cause the formation of cicatricial tissue and result in incurvation of the organ.

Since discovering the cause of this condition I have modified the method of using the Otis dilating urethrotome. The method as now employed by me is as follows. After the instrument has passed slightly beyond the stricture the blades of the instrument are separated just widely enough to fill the calibre of the stricture comfortably and not to overdilate the canal so causing the stricture to become fixed and present an unyielding surface to the passage of the knife. Since adopting this technic I have used this instrument in a large number of cases without subsequent development of untoward results and I have come to regard this form of urethrotome as one of the most satisfactory and reliable instruments that can be employed for performing internal urethrotomy.

The surgeon engaged in genito-urinary work has long since learned that a chronic anterior urethritis associated with a stricture of large calibre in the so-called recent or succulent stage is frequently associated with peri urethral thickening due to cell proliferation that interferes materially with the dilatability of the urethra. In such cases he has discovered that better results are obtained by gradual dilatation employing the conical steel bougie for this purpose than by attempting urethrotomy.

The once highly lauded and popular method of treating such cases by internal urethrotomy has long since been abandoned and in consequence incurvation of the penis resulting from this method of treatment is now but seldom encountered.

In concluding, let me warn the surgeon not to be carried away by the gratifying result that I was fortunate enough to obtain in the case cited, that he be not led to operate indiscriminately upon cases of this kind that may come under his care. In the past fifteen years I have seen several similar cases, but only in the one just recounted have I deemed operation justifiable. In the others the scar tissue was so extensively connected with the penile urethra and the corpus cavernosum that an extensive resection of the fibrous mass would have resulted in a hopeless mutilation of the body of the organ.

THE PRINCIPLE OF THE TEALE FLAP APPLIED TO AMPUTATION OF THE PENIS

BY WILLIAM M MASTIN M D

OF MOBILE, ALABAMA.

IN a case of carcinoma of the glans penis where amputation was performed some ten years ago the hæmorrhagic oozing from the corpora cavernosa was so persistent and troublesome—despite the use of numerous ligatures together with the application of the cautery and finally only yielding to inversion and firm suture of the sheaths of the cavernous bodies—that I sought some modification of the usual operative technic by which this complication might be avoided or controlled

It then occurred to me that this could be accomplished by the application of the principle of the Teale method of amputation of the extremities—that is by incising the cavernous structures horizontally forming a long lower or posterior flap and bending this upward on itself to be snugly sutured to the upper transversely divided end. It seemed probable that this would secure the necessary pressure hæmostasis and at the same time produce a symmetrically fashioned stump

With this idea in view the following technical steps were evolved and the completed operation has resulted so admirably in several instances that I venture to offer it as a very satisfactory method of performing partial amputation

First Step—With a constricting band encircling the base of the penis the integumentary flap is formed either by a long anterior and short posterior oval flap or by the antero-postero-rectangular Teale flaps—the anterior long flap corresponding in length approximately to one half the circumference of the organ and the short posterior flap to one fourth of this length. This character of flap is preferred to the circular cuff method since the cutaneous scar is placed underneath and be-

hind the urethral outlet The skin flaps are then freed and retracted

Second Step—The two cavernous bodies are now trans-fixed laterally by a narrow knife, somewhat in advance of the base of the skin flaps, and split down to the extent of giving the proper length to the proposed flap, at which point the edge of the knife is turned downwards and the lower segment, containing the corpus spongiosum, cut through The upper segment is next divided transversely on a level with the point of the original entrance of the knife, thereby severing the remaining attachments of the diseased portion to be removed

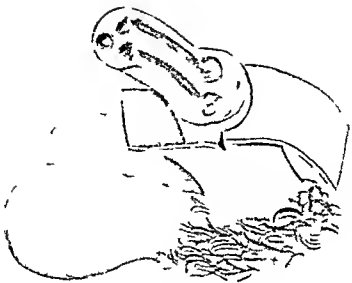
Third Step—The spongy body enclosing the urethra is next dissected from its bed to the required distance, the vessels ligated with fine chromicized catgut, and the cavernous flap turned upward and sutured to the superior half of the corpora cavernosa One or two lateral sutures give both additional support and greater security against bleeding

Fourth Step—Finally, the urethra is divided at an angle obliquely downwards, then split either laterally or on its dorsal surface, and stitched, in the ordinary manner, to a button-hole opening made in the anterior skin flap The cutaneous flaps are approximated with interrupted sutures of horse hair or fine silkworm gut

The hæmostasis is complete, and a shapely, well-rounded stump is formed The line of skin union is posterior to and away from the urinary meatus In addition, the urethra and cutaneous flaps are not in contact with the usually transversely divided cavernous stump, and, therefore, the urethral meatus has less tendency to become strictured and deeply depressed, or of an infundibular form, produced by the contracting cicatrix, as frequently occurs after the usual circular amputation

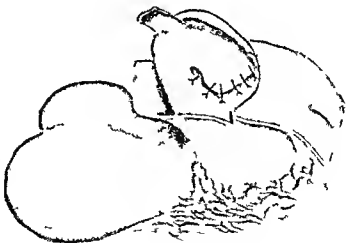
Another advantage, and which is possibly the most important feature of the operation, is that a more radical removal of diseased tissue, with a minimum of shortening of the organ, can be effected by this method Observation has definitely shown that epitheliomatous disease of the penis oftener origi-

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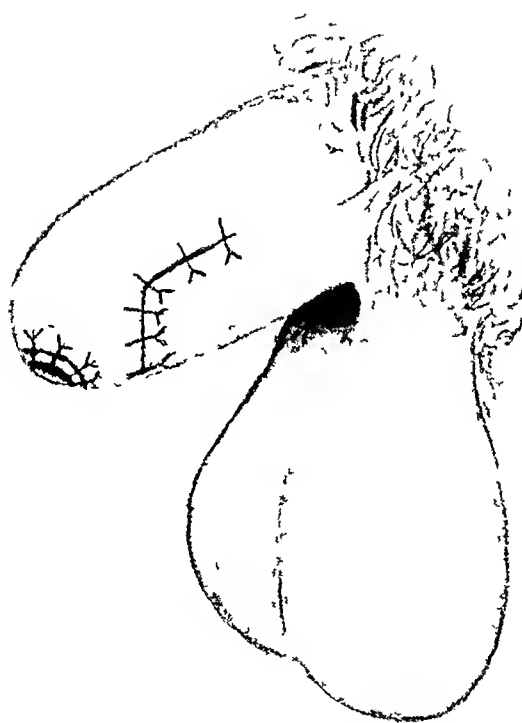
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FIG 3



Showing the skin flaps sutured and the operation completed

nates superficially about the corona glandis and the mucous surface of the prepuce than elsewhere on the organ and that the route of extension is by way of the main lymphatic trunks occupying the dorsum. The lymphatic radicles of the anterior extremity of the penis largely converge to these large dorsal channels which pass backward in the subcutaneous tissue on both sides of the dorsal blood vessels to empty into the lymph nodes of the groin and pelvis. Consequently by dividing the corpora cavernosa laterally and cutting away the upper halves—as far back as the pubis if necessary—the lymphatic ducts coming from the diseased area are in greater part removed and the lower halves composing the flap which are less rich in lymphatics are utilized to give increased length to the stump. Furthermore the bilateral skin incisions can be prolonged on either side into the inguinal regions the upper skin flap reflected upward onto the pubis and the dissection extended so as to include the groin glands as in the operation practiced by Nicolls of Glasgow (*vide ANNALS OF SURGERY* February 1909 p 240 *et seq*). Again on account of the lymphatic distribution to the dorsum of the penis and the consequent greater danger of the cutaneous lymphatics in this locality being infected the integumentary flaps can be reversed—that is taking the long flap from the under surface and the short flap from the dorsal aspect of the organ.

This procedure is necessarily restricted to the early stages of the disease where the neoplasm is limited to the glans or prepuce and before infiltration of the spongy and cavernous bodies occurs—the dense fibrous sheaths of the latter resisting carcinomatous invasion until late in the progress of the disease—allowing sufficient sound tissue for safe utilization in the formation of the flaps.

Figs 1 2 and 3 indicate the several stages of the operation.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, held December 8, 1909

The President, DR ELLSWORTH ELIOT, JR, in the Chair

SARCOMA, WITH MULTIPLE SKIN METASTASES

DR GEORGE D STEWART presented a boy, 12 years old, whose family history was negative His past history was also unimportant with the exception of the fact that the patient fell out of a hammock two years ago, striking on his back No definite connection, however, could be traced between that injury and his present trouble

About the middle of June, 1909, an abscess appeared over the left shoulder-blade This opened spontaneously, but the opening was subsequently enlarged by the attending physician The wound healed shortly after this, but before July 1, 1909, a lump about the size of a hickory-nut appeared in the patient's left axilla, this grew rapidly, and was not painful at first

In August, 1909, when Dr Stewart first saw the patient, he had a large tumor in the left axilla, this was tender, but not reddened The boy's temperature at this time was 101, his pulse ranged between 100 and 114 A blood count showed 22,000 leucocytes, with 70 per cent polymorphonuclears and 21 per cent lymphocytes The attending physician had regarded the tumor in the axilla as an abscess, but there was something in its appearance—its shape and color—as well as in the appearance of the patient himself that suggested sarcoma However, as his temperature and leucocyte count continued, an incision was made into the axilla on August 14, and some friable tissue, probably swollen lymph-nodes, was removed, a certain amount of bloody grumous material, not distinctly purulent, escaped at the same time The tissue was dark in color and more friable than liver tissue It was submitted to Dr Crowell of the Pathological

Laboratory of Bellevue Hospital who reported that it consisted of partially organized inflammatory exudate. Microscopically it showed an exudate of fibrin and polymorphonuclear leucocytes with the formation of some young connective tissue cells and new blood vessels. He pronounced the lesion an acute fibrinopurulent inflammation with partial organization.

Despite this report and despite the persistence of the leucocytes Dr Stewart said he still believed the case to be one of malignant disease. Accordingly, on August 29, 1909, the tissue already having begun to fungate, he enlarged the opening slightly and cleaned out several large masses which separated easily from the fascial covering of the muscles bounding the axilla. Cultures were taken and the tissue removed was kept warm and sent to the Pathological Laboratory. On this second specimen Dr Crowell reported as follows: Further microscopic sections of the tissues from the axilla of this patient show it to be a sarcoma of the lymphoid type. It is very vascular, blood lying free in the interstices of the tissue. Cultures from the material taken at the time of the operation and in the laboratory were sterile.

From this time on the axilla continued to enlarge, the growth beginning to fungate through the incision and soon afterwards the lymph nodes in the opposite axilla began to enlarge. The boy's general health continued remarkably good, his temperature running up to about 100 and his pulse ranging between 80 and 100. In September a small growth appeared in the mid axillary line about the level of the ninth rib; this was irritated by the bandages and about the size and color of a purple plum, and since no melano is had thus far appeared it was at first supposed to be due to the irritation of these bandages. On further observation, however, it did not break down and a small incision was made into it, the cut surface looking like a non-resolved blood clot. On October 11, 1909, the boy was submitted to Dr John A. Fordyce, who suggested the possibility of sporotrichosis but upon microscopical examination he agreed in the diagnosis of sarcoma, calling it a round-celled sarcoma. He suggested the use of arsenate of soda in increasing doses and stated that the complete disappearance of the primary lesions of sarcoma of the skin was unusual.

On the following day the patient was seen by Dr William B.

Coley, who regarded the prognosis as grave. The mixed toxins had already been administered to the patient, and Dr. Coley advised their continuation for two or three weeks longer. This was done, and the dose was gradually increased until sharp reactions, with a temperature of 103 to 104, followed. The treatment was continued for five or six weeks, but without noticeable restraint upon the size of the growth. Cultures from the axilla and smears made from the melanotic tumor were sterile. Coley's fluid was discontinued, but the arsenate of soda was kept up and pushed to the limit of tolerance, but it apparently had no effect on the growth. New tumors have recently appeared, including one large one covering the umbilicus, and several on the scalp and forearms.

After the appearance of a pigmented tumor on the opposite side, the scar of the so-called abscess was more closely examined. It was small, there were no irregularities in the skin, but close inspection showed slight pigmentation.

This case was interesting from several points of view, as follows: (1) It suggested, because of the primary abscess, the temperature and leucocytosis, an infection, (2) it was interesting to note that the first metastasis at any distance from the primary growth was apparently in a lymph-node, (3) the healing of the primary focus was unusual.

Dr. Stewart said that further examination of the pigmented tumors of the skin was necessary and would be made.

RECURRING TROPICAL ABSCESS OF THE LIVER

DR. STEWART presented a man, who in August, 1906, went South to work in Georgia and Florida as a laborer. The following April he returned to New York. He had some bowel trouble and visited the Hudson Street Hospital, where a diagnosis of amebic dysentery was made and he was transferred to Bellevue Hospital. Here he received irrigations, but remained only one day.

He returned to Bellevue on May 14, 1907, complaining of pain in the upper right quadrant of the abdomen and in the pit of the stomach. He also suffered from diarrhœa, with eight or nine stools daily, accompanied by cramp-like pains, tenesmus and weakness. Upon examination at this time, the liver was felt below the free margin of the ribs, the gall-bladder was palpable and tender, and there was abdominal rigidity. A diagnosis of chole-

cystitis was made and on May 14 a cholecystectomy was done. The liver appeared to be congested, the gall bladder was adherent and distended. When the patient left the hospital on June 24, 1907, his wound had healed and he was in good health, although his stools were still more frequent than normal.

About three weeks later he was re-admitted to the hospital complaining of pain in the right shoulder and chest. His temperature was 103 and there were signs of fluid in the right chest. A thoracostomy was done but no pus was found. His pulse and temperature slowly fell to normal and the patient was discharged improved on August 4. He was re-admitted on the twenty-eighth complaining of cough with expectoration of thick, bloody mucus and signs of consolidation over the right lung. The sputum was sent to the laboratory where it proved to be pure from the liver. The patient improved slowly and left the hospital on September 20. He returned a month later complaining of cough which was paroxysmal in character and thick, bloody expectoration. His temperature on admission was 103, pulse 120. He also suffered from diarrhoea and tenesmus. On January 1, 1908, a blood count showed 3,000,000 red blood cells and 44 per cent of hæmoglobin. The liver was large and gradually increasing in size. There was consolidation of the lower right lung. These symptoms persisted, the cough continued, the patient lost weight and showed a marked secondary anaemia. During this time amœbæ were frequently demonstrated in the stools.

On February 8, 1908, the patient first came under Dr Stewart's care. Under cocaine anaesthesia Dr Stewart removed an inch and three-quarters of the tenth rib on the right side and after suturing the diaphragm to the parietal pleura, the diaphragm was opened just over the anterior fold of the coronary ligament and the abdominal cavity packed off. A needle was then introduced into the liver, locating an abscess from which ten or twelve ounces of pus were evacuated. The abscess was drained and subsequently suction was applied by Bier's cup method. Following this operation the patient's cough rapidly ceased. By the middle of April his wound had healed completely, he had gained 45 pounds in weight and his anaemia had markedly improved. His stools, however, were still frequent in spite of repeated irrigations of silver nitrate and quinine solutions. On May 27, 1908, an appendicostomy was done and by this route through and

through irrigations were continued until June 6, 1908, when he again began to suffer from a slight cough, with pinkish expectoration, and signs of consolidation in the right lower lobe posteriorly. At this time his stools were still frequent and the amœbæ were still present. The appendicostomy wound remained open. There was some resistance in the upper part of the abdomen. Temperature, pulse and respirations were normal.

From this time until January 16, 1909, the patient remained in the medical ward of the hospital receiving treatment for dysentery, first through the appendicostomy wound, and subsequently, when that closed, irrigations were again instituted through the rectum. The number of stools daily varied from two to eight, and the presence of amœbæ was demonstrated repeatedly. In the meantime his cough had increased in frequency and severity, and his pulse and temperature gradually rose. After a severe fit of coughing, he would often expectorate a large amount of pus, which would be followed by a decline in his pulse and temperature. The expectoration was typical, resembling anchovy sauce. There was a gradual increase in lung involvement, the dulness rising higher and higher. The liver was also increased in size. The patient again began to lose weight and strength and to develop secondary anæmia.

On January 16, 1909, he was again transferred to the surgical ward. At this time his general condition was poor. He had severe paroxysms of coughing, with free expectoration. His temperature ranged between 99 and 103, respirations, 24 to 30. He had from two to five stools daily, with cramp-like pains in the abdomen. Amœbæ were still present. There was dulness over the entire lower chest posteriorly, from the angle of the scapula downwards. The liver was much enlarged, occupying the entire right upper abdomen.

On February 15, 1909, under cocaine, an incision was made over the eighth rib posteriorly. An aspirating needle which was introduced seemed to enter dense fibrous tissue, and no abscess was located. The needle puncture was enlarged with dressing forceps and a tube was inserted through which some bile and a little pus escaped. Ten days later this wound was enlarged and the liver explored in all directions. A tube was again inserted, which discharged considerable pus and some bile. The patient's cough was not relieved, and he showed but little improvement.

On April 20 1909 the dulness posteriorly extended above the angle of the scapula. A needle was thrust through the sixth intercostal space and typical anchovy sauce pus obtained. Under cocaine a portion of the sixth rib was resected and about twelve ounces of thick pus evacuated. A drainage tube was left in the wound which discharged freely. Within two weeks after this operation the patient's cough and expectoration had entirely ceased. In August the drainage was discontinued and the sinus closed. Rectal irrigations were still continued and the stools varied in number from one to eight daily. Amœba could still be demonstrated in the stools at the present time. The patient's pulmonary condition continued to improve the lung had expanded there was no cough and the breathing sounds could now be heard almost to the base of the right lung. The liver was still enlarged. The patient still suffered from abdominal distention and pain.

This case Dr. Stewart said illustrated the persistence of the amœbæ and the futility of all remedies directed against them irrigations both through the rectum and through the appendicostomy wound having been equally useless. It had been found that the easiest way of obtaining the amœba was to pass a rectal tube leaving it in from a few minutes to half an hour and upon its withdrawal the amœba were on the summit of the tube.

The case also illustrated the fact that when an abscess of the liver had perforated into the lung the spontaneous opening was rarely adequate for drainage and more efficient drainage should be instituted elsewhere. This was usually difficult to accomplish and in making the attempt one should remember that the rupture generally took place from the highest part of the liver that is it opened into the liver nearer the posterior than the anterior surface. Keeping this fact in mind would help in the guidance of the exploring needle and it would also help to determine one to choose the transpleural route which he believed to be the proper one in nearly every case of solitary liver abscess. When the enlargement was upwards as it frequently was drainage from behind was more satisfactory and rational than from in front and when there was no enlargement downwards drainage from in front was difficult and might be dangerous. When an exploratory laparotomy had been performed one could select the spot

where there were adhesions or a pointing abscess after the rib had been removed the diaphragm might be pressed from below into the wound, sutured there, and adhesions might be waited for, or, if present, the liver might be at once exposed. If no abdominal wound was made, the liver might be explored after the careful resection of a rib, suturing the two layers of pleura and opening the diaphragm, with or without waiting for adhesions.

The use of cocaine was to be commended in these operations, there is little pain, as the liver is not very sensitive. With a general anæsthetic, this patient would probably have been drowned in pus.

MESENTERIC CYST IN A CHILD

DR WILLIAM B COLEY presented a boy, ten years old, who came under the speaker's observation seven weeks ago. Upon examination, the abdomen presented a tumor about the size of an adult head. It appears to be cystic in character, and could be differentiated from ascites by careful palpation and change of position. By exclusion, Dr Coley said, he made a diagnosis of probable mesenteric cyst, although he had never seen one before. Upon operation, he found a cyst containing material of a dark reddish-brown color. This was submitted to Dr Frederic E Sondern for analysis, who reported as follows:

The fluid has a brownish red color, no odor, an alkaline reaction, specific gravity 1022, with pronounced deposit. No coagulum, and is not tenacious. Albuminoid substances 42 per cent by weight, sodium chloride 18 per cent. Sugar and urea are not present. The microscopic examination of the sediment shows chiefly blood, with considerable cholesterolin, some granular corpuscles, and epithelial cells, some of which are fatty. Cyst count: Lymphocytes 44 per cent, polynuclear cells 56 per cent, micro-organisms were not found.

The cyst apparently originated in the mesentery of the jejunum. In order to resect it, it would have been necessary to remove about two feet of small intestine, but by cutting through the peritoneal coat of about two inches of gut and peeling it backward, he finally succeeded in enucleating the entire cyst. He then restored the peritoneal coating and closed it without leaving a raw surface. The wound was closed without drainage. The boy made a perfectly good recovery and left the hospital at

the end of two weeks. The operation was completed in about forty minutes.

Dr. Coley, after referring to the rarity of these cases, stated that in this instance it had been regarded as a malignant growth and it was with that diagnosis that the patient had been referred to him. The cases were still so few in number that no definite rule of operative procedure could be applied to them. When Dr. Charles N. Dowd reported his case to the Society in 1900 there were about 136 cases on record and the number now had increased to 150. Those cases in which the cyst was excised gave a mortality of 40 per cent, while those in which it was simply drained gave a mortality of 6 per cent.

STENOSIS OF THE PYLORUS AND DUODENUM WITH EXCISION AND POSTERIOR GASTRO ENTEROSTOMY

DR. JOHN F. ERDMANN presented a woman 21 years old who four years ago began to have pain in the abdomen which had persisted up to the present time. Eight months ago she began to vomit frequently and complained of constant pain in the upper right quadrant of the abdomen which became worse shortly after eating. When severe it radiated towards the epigastrium. Vomiting which occurred about an hour after eating usually relieved the pain. The vomitus was bitter and sour and never contained blood. Belching and the regurgitation of a bitter fluid frequently occurred after eating. The patient's appetite was poor, her bowels were habitually constipated. She had occasional headaches, no dizzy spells, no eye symptoms, no oedema. An X-ray was taken which showed a stenosis in the region of the pylorus.

Operation November 12, 1909. Upon exploring the pyloric region a stenosis was found with considerable cicatricial tissue proximal to the pylorus. An inch and a half of the duodenum was contained in the cicatrix bound in dense adhesions so that the diameter of the entire mass in this section was not over three eighths of an inch. Excision of this portion of the duodenum was done, the proximal end was inverted with purse string sutures and a like procedure was carried out at the pyloric end of the stomach. A posterior gastro enterostomy was then done. The patient made a prompt recovery and had since gained considerably in weight.

PYLORECTOMY AND PARTIAL GASTRECTOMY FOR
PERFORATING ULCER

DR ERDMANN presented a woman, 39 years old, whose history dated back six or seven years. She complained of vomiting and difficulty in taking food for several months before she was admitted into the Post-Graduate Hospital. Dr Erdmann operated upon her in January, 1909, and found an old, perforated ulcer of the pylorus, with dense adhesions and much exudation. He excised the lower third of the stomach, turned in the proximal end of the duodenum and did a posterior gastro-enterostomy. The woman made perfect recovery, and had gained 70 pounds since the operation.

TUBERCULAR STENOSIS OF THE ILEUM, WITH EXCISION

DR ERDMANN presented a man, 38 years old, who one year ago had an attack of epigastric pain following a heavy meal. This was relieved by an emetic and he had no further trouble until four months ago, since which time he had severe pains whenever he was constipated for 48 hours or longer. These attacks of pain came on at irregular intervals—sometimes two or three days or one or two weeks would elapse between them. The pain had no relation to the kind of food taken, but he was always relieved by catharsis. During these attacks there was some abdominal distention. He never vomited, excepting following catharsis. There was no history of blood in the vomitus nor stools. His appetite was good, but he feared to eat on account of the subsequent pain. His weight had decreased 30 pounds in four months.

When this patient entered the Post-Graduate Hospital, Sept 8 1908, in Dr Quintard's service, to whom Dr Erdmann is indebted for the case, there was no tumor of the abdomen, no rigidity nor tenderness. The stomach contents were examined with negative results. He had a few external hemorrhoids which were removed by another surgeon, and the patient left the hospital on October 22, improved. He was re-admitted on November 11, 1908, complaining of constant cramps after eating, the pain beginning just above the navel about one or two hours after taking food. All foods excepting liquids produced these cramp-like pains. The pain gradually increased in severity until the patient sought relief by an emetic, or until relief came in the

course of about ten hours. Recently the patient had observed gurgling and peristalsis during these attacks.

Upon palpation a cylindrical shaped mass was felt in the abdomen in the left lumbar region. There was visible peristalsis most noticeable in the region of the mass. As the patient felt somewhat improved he asked for his discharge. Upon his return to the hospital on February 3, 1909, he stated that for eighteen days after his second discharge he had been free from symptoms but after indulging in his Christmas dinner the pain had recurred.

Operation by Dr. Erdmann, February 9, 1909. Through an incision made below the umbilicus the small intestine was found not to be completely obstructed. The ileum was not sharply contracted and about normal in size. Upon pulling up one coil of intestine after another a coil of ileum was exposed with a spot about the size of a finger nail which was the seat of two or three small growths resembling tubercles. A clamp was applied to this area as a marker and the intestine was further exposed and finally in the right quadrant a mass four inches in length was found with a central contraction which appeared to be carcinomatous although its outer surface strongly suggested tuberculosis. At the time of the operation it appeared to be tubercular but the annular contraction suggested malignancy. The jejunal portion was about an inch and a half in diameter while at the proximal end there was marked dilatation and hypertrophy.

It was decided that the most rapid method of performing an anastomosis would be to clamp the ends and invert by purse string sutures. About sixteen inches of gut were resected and a Roosevelt clamp was used to perform a lateral anastomosis. The patient made a perfect recovery and left the hospital on February 25, 1909.

The pathological report made by Drs. Brooks and Coffin stated that the specimen showed a complete tubercular stricture of the gut with typical tubercle bacilli, giant cells and miliary nodules.

HEMORRHAGE FOLLOWING TONSILLECTOMY

DR. ADRIAN V. S. LAMBERT presented a girl six years old who was admitted to the Roosevelt Hospital in Dr. L. W. Hotchkiss's service on November 20, 1909, with the following history:

On the afternoon previous to her admission her tonsils were removed by enucleation by the finger, and her adenoids were removed by the curette. She had bled profusely at the time, the bleeding soon diminished in amount, but still continued to a slight extent. During the night she had several times vomited large dark blood-clots, and had expectorated bright blood from time to time. She had been very restless, and small doses of morphine had been given to quiet her. Various gargles had been employed, but with no effect on the bleeding.

On admission to the hospital, the child was very pale and restless, with a pulse of 160, respirations, 32. She was spitting up bright red blood at the time, and soon after admission she vomited four ounces of dark clotted blood and went into collapse. Her pulse became imperceptible at the wrist, respirations were rapid and shallow, but regular. She was at once given 250 c c of saline infusion intravenously, and two hours after admission she was taken to the operating room and a transfusion was done, the mother being the donor. The connection was readily made by means of the Elsberg cannula. The flow was free and rapid, and was allowed to continue for about forty minutes. The child before the transfusion was unconscious and almost exsanguinated, so much so, that she did not move when the incisions were made to expose the veins, and there was scarcely any bleeding from the wounds. When she was returned to the ward she was in excellent condition, with a pulse of 124 and respirations 24. She was perfectly conscious and all hemorrhage had ceased. She was given three minims of Magendie's solution and slept for four hours, then she awoke and cleared her throat by a slight cough, which was followed by a profuse hemorrhage of eight ounces of bright blood lasting twenty minutes. The flow then became less rapid, but there continued a slight, continuous flow evidenced by constant spitting up of small quantities of bright blood. Her pulse again became rapid and small, she was very restless and complained of thirst.

She was again taken to the operating room, and after etherization by the drop method, open cone, an examination of the pharynx and fauces was made, which revealed a constant flow of bright blood from the left tonsillar bed. No bleeding point could be made out. The left external carotid artery was thereupon ligated in its first portion near the bifurcation. This in-

stantly and completely controlled all bleeding. The child made an uneventful recovery with the exception of an infection of the wound in the arm by *staphylococcus pyogenes aureus*. This is now granulating and has about healed.

DR. ELIOT said that in 1888 at the New York Hospital Dr. Edward White Clark checked a persistent hemorrhage from the tonsil by inserting a suture encircling the tonsil.

DR. FRANK S. MATHEWS said that at the St. Mary's Hospital for Children they had had one fatal case among 600 children who were operated on for tonsils and adenoids during the past year. Enucleation of the tonsil gave rise to more hemorrhage than tonsillotomy. The main indication in these cases was to check the primary hemorrhage. The case reported by Dr. Lambert appeared to be one of persistent primary hemorrhage. Personally he made it a point to see that the bleeding was checked before the child left the table. The oozing could usually be readily checked by taking the end of a moistened bandage and plugging it into the tonsillar cavity, the plug being sufficiently large to cover the pillar and then pressing it against the jaw with two fingers. The pressure in order to be effective should be made against the lower pole of the tonsillar fossa, as the bleeding usually came from there from one of the branches of the facial artery. The upper portion of the tonsillar cavity never seemed to bleed.

TUBERCULOSIS OF THE TONSIL

DR. FRANK S. MATHEWS presented a boy eight years old who came to St. Mary's Hospital for Children suffering from tuberculous glands of the neck. An abscess and the glands were excised and two weeks later the stumps of the tonsils were removed. The history obtained was that the boy had had his tonsils clipped some months before. Soon afterwards the glands in the left side of the neck became enlarged and later on an abscess formed. The stumps of the tonsils on examination showed typical discrete miliary tubercles.

Clinically recognizable tuberculosis of the tonsil Dr. Mathews said was rarely seen. Moreover routine examinations of the tonsils as in the cases of Hodenpyl who sectioned several hundred failed to show evidences of tuberculosis. The speaker said he had not examined tonsils as a routine procedure but had examined a number which grossly showed spots suggestive of

tubercle without finding it in any instance In a number of tonsils from patients with large tuberculous glands of the neck he had been equally unsuccessful in finding tuberculous ones He had made a practice of inspecting the throats of all patients with tuberculous glands, and as a result felt that there was no relation between tuberculous glands of the neck and any particular kind of tonsil One might see large or small or buried or elevated tonsils in a series of children with glandular tuberculosis Such facts might make one question whether the tonsil was the usual site of entry of the bacillus Personally, he believed that nine-tenths of the cases were infections through the faucial or pharyngeal tonsil This was strongly suggested by the fact that the tonsillar nodes were usually the first to be enlarged in tuberculosis Hurd had recently reported eight cases of tuberculous tonsils, and concluded that tuberculosis was to be found in the buried rather than in the large hyperplastic tonsils, that the tubercles were to be found deep-seated at the bottom of the crypts of the tonsil just inside of its capsule, and that in cases of neck adenitis of long standing, tuberculous foci, if there were any, would not continue to be demonstrable in the tonsil We must look for tubercle of the tonsil in early cases Tuberculous adenitis had been produced by rubbing tubercle bacilli upon the tonsil of animals without producing tuberculosis of the tonsil itself, a condition analogous to the frequently observed tuberculous mediastinal nodes without demonstrable lung lesions

Evidence, so far as it went at present, would indicate that the tonsil was the usual portal of tuberculous infection in cases of cervical adenitis, even though tuberculosis of the tonsil was so infrequently demonstrated A lesion might be produced in the tonsil, but it tended to heal rather than go on to tuberculous ulceration The reasons why tuberculous tonsils were so infrequently seen were, first, the surgeons did not as a rule remove the tonsils when operating on tuberculous adenitis, second, when they were removed, tonsillotomy and not tonsillectomy was done, and, as Hurd showed, the tubercle was in the deep portion of the tonsil that was left behind The case presented to-night, Dr Mathews said, bore out that statement It seemed perfectly possible that the tubercle bacillus frequently passed through the tonsil without lesions or only such as would be discovered by making serial sections

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Eisendrath a number of years ago urged the wisdom of attending to the tonsils in all cases of cervical adenitis. Dowd's statistics showing over 90 per cent of cures in *early* glandular infections and 75 per cent to 80 per cent of cures in a total of 250 cases in all stages of the disease would show at least that it was not usually necessary. Whether these statistics would have been made better or worse by adding another operation to that of adenectomy remained to be seen. If the tonsil did not harbor the tubercle bacillus at the time of the neck operation it would certainly be wiser not to have the patient incur the additional operation. If it did of course there was the possibility of reinfection of the neck.

This case as well as two others seen recently by the speaker in private practice indicated that tonsillotomy was no safeguard against tuberculous invasion of the neck nodes while presumably tonsillectomy was.

OLD UNUNITED FRACTURE OF FEMUR PSEUDARTHROSIS

DR. MATHEWS presented a woman fifty years old who 23 years ago sustained a simple fracture of the middle third of the right femur. This was treated by the usual methods but failed to unite. She was then sent to a large hospital where she received the best surgical attention. The fragments were first rubbed together and subsequently an open operation was done but no union resulted. An iron brace was then applied and the patient was able to get about with the aid of a crutch. After five or six years she found she could get along without the crutch and in the course of time she also abandoned the brace. Since then she had walked without artificial aid.

There was four inches shortening in the right leg and the X ray (see Fig. 1) showed that the ends of the two fragments were ununited and the bones everywhere at least an inch apart. They were freely movable and there was apparently only fibrous union between them but in spite of that the woman stated that she was able to walk five miles with comparative comfort.

CHOLECYSTOSTOMY FOR GALL-STONES

DR. ALEXANDER B. JOHNSON presented a woman 38 years old who was admitted to the New York Hospital on September 13, 1909. For one week prior to admission the patient had severe

cramp-like pain in the right hypochondrium This was present almost constantly, with slight remissions, and was relieved only by morphine The pain radiated toward the shoulder, and during these attacks there was profuse perspiration She had suffered from nausea, but no vomiting No jaundice had been noted, there were no urinary symptoms She was constipated, but her stools had always been normal in color, so far as she knew

Examination revealed tenderness over the right hypochondrium, particularly in the region of the gall-bladder The liver was normal in size The patient was obese and the abdominal wall unusually thick

On September 14, Dr Johnson made a vertical incision, seven inches long, at the outer border of the right rectus The gall-bladder, which presented in the wound, was markedly enlarged Mucus and bile were aspirated with the suction trocar, and several stones were removed, ranging in size from that of small shot to that of a beechnut No stones were found in the common duct A drainage tube was inserted and the wound closed Drainage was continued until the twentieth day With the exception of a slight post-operative temperature, the patient's recovery was uneventful, and she left the hospital on October 9, 1909

A second case of cholecystostomy was shown by Dr Johnson A single woman, 54 years old, who was admitted to the New York Hospital on October 14, 1909 For the past year she had had indefinite, dull pains in the right hypochondrium A week ago she was seized with a very acute pain which radiated up into the right shoulder-blade and toward the epigastrium There was no history of jaundice She had vomited once or twice during her last attack, and had complained of chills Her stools had always had a good color

Examination revealed tenderness to deep pressure in the right hypochondrium The abdomen was otherwise negative The heart showed the changes of a chronic myocarditis, without valvular involvement

On October 23 Dr Johnson exposed the gall-bladder by a vertical incision about five inches long through the right rectus The gall-bladder was distended, and its contents, which were chiefly mucus, aspirated Upon exploration, one small, round, non-faceted stone, about the size of a large pea, was found and removed from the cystic duct A drainage tube was then inserted, with a strip of gauze packing beside it

The patient made an uneventful recovery with a very slight rise in temperature the day following operation. The wound healed *per primam* with the exception of the sinus left for drainage. The tube was removed in a week's time. After that there was a very moderate flow of bile and mucus for about ten days when this ceased and the sinus closed by granulation. At no time was there any evidence of suppuration. The patient's heart never gave any symptoms after the operation.

GUNSHOT WOUND OF THE BRAIN

DR JOHNSON presented a man 34 years old who on November 3, 1909, received a pistol shot between the eyes, the revolver being held close enough to fill his face full of powder grains and inflict a slight burn. He was brought to the hospital and taken to the operating room a few hours later, never having lost consciousness nor in any way shown any specific effect of his brain injury. There were no focal symptoms, merely bleeding from the wound together with the escape of brain tissue with pronounced oedema of the tissues around the point of entrance of the bullet. No headache.

Operation. Upon enlarging the wound in the forehead and opening the frontal sinus it was found that the bullet had penetrated the orbital plate of the frontal bone. Brain tissue was issuing through the perforation in the bone. Drainage of the cranial cavity with a small gauze wick.

An X-ray picture showed that the bullet now lay in the body of the sphenoid bone. Microscopical examination of the particles of suspected brain tissue removed at the time of operation showed brain tissue with numerous scattered hemorrhagic foci.

After the operation the patient made an uneventful recovery, the wound healing by granulation.

DR WILLY MEYER said that at a meeting of the Society about three years ago he showed a young man from whose cranial cavity a bullet had been removed by him on the urgent request of the patient. The case was one of attempted suicide, the patient shooting himself in such a way that the bullet divided both olfactory and both optic nerves, resulting in total blindness and a loss of the sense of smell. In addition to this there were severe and persistent headaches. An X-ray was taken which showed the bullet lying close to the sella turcica, together with splinters of

cramp-like pain in the right hypochondrium This was present almost constantly, with slight remissions, and was relieved only by morphine The pain radiated toward the shoulder, and during these attacks there was profuse perspiration She had suffered from nausea, but no vomiting No jaundice had been noted, there were no urinary symptoms She was constipated, but her stools had always been normal in color, so far as she knew

Examination revealed tenderness over the right hypochondrium, particularly in the region of the gall-bladder The liver was normal in size The patient was obese and the abdominal wall unusually thick

On September 14, Dr Johnson made a vertical incision, seven inches long, at the outer border of the right rectus The gall-bladder, which presented in the wound, was markedly enlarged Mucus and bile were aspirated with the suction trocar, and several stones were removed, ranging in size from that of small shot to that of a beechnut No stones were found in the common duct A drainage tube was inserted and the wound closed Drainage was continued until the twentieth day With the exception of a slight post-operative temperature, the patient's recovery was uneventful, and she left the hospital on October 9, 1909

A second case of cholecystostomy was shown by Dr Johnson A single woman, 54 years old, who was admitted to the New York Hospital on October 14, 1909 For the past year she had had indefinite, dull pains in the right hypochondrium A week ago she was seized with a very acute pain which radiated up into the right shoulder-blade and toward the epigastrium There was no history of jaundice She had vomited once or twice during her last attack, and had complained of chills Her stools had always had a good color

Examination revealed tenderness to deep pressure in the right hypochondrium The abdomen was otherwise negative The heart showed the changes of a chronic myocarditis, without valvular involvement

On October 23 Dr Johnson exposed the gall-bladder by a vertical incision about five inches long through the right rectus The gall-bladder was distended, and its contents, which were chiefly mucus, aspirated Upon exploration, one small, round, non-facetted stone, about the size of a large pea, was found and removed from the cystic duct A drainage tube was then inserted, with a strip of gauze packing beside it

The patient made an uneventful recovery with a very slight rise in temperature the day following operation. The wound healed *per primam* with the exception of the sinus left for drainage. The tube was removed in a week's time. After that there was a very moderate flow of bile and mucus for about ten days when this ceased and the sinus closed by granulation. At no time was there any evidence of suppuration. The patient's heart never gave any symptoms after the operation.

GUNSHOT WOUND OF THE BRAIN

DR JOHNSON presented a man 34 years old who on November 3, 1909, received a pistol shot between the eyes, the revolver being held close enough to fill his face full of powder grains and inflict a slight burn. He was brought to the hospital and taken to the operating room a few hours later, never having lost consciousness nor in any way shown any specific effect of his brain injury. There were no focal symptoms, merely bleeding from the wound together with the escape of brain tissue with pronounced oedema of the tissues around the point of entrance of the bullet. No headache.

Operation. Upon enlarging the wound in the forehead and opening the frontal sinus it was found that the bullet had penetrated the orbital plate of the frontal bone. Brain tissue was issuing through the perforation in the bone. Drainage of the cranial cavity with a small gauze wick.

An X-ray picture showed that the bullet now lay in the body of the sphenoid bone. Microscopical examination of the particles of suspected brain tissue removed at the time of operation showed brain tissue with numerous scattered hemorrhagic foci.

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lead Cramotomy was done by means of a horse-shoe flap, the bullet was located and removed, but, as anticipated, the operation did not relieve the patient's headaches. He subsequently succeeded in taking his life.

CROSSED RENAL DYSTOPIA WITH FUSION

DR ALEXANDER B JOHNSON presented a man aged 20 years, clerk, who was admitted to the New York Hospital February 2, 1908

Up to this present illness he had never observed any symptoms referable to his genito-urinary apparatus. One year ago he began to suffer from attacks of cramp-like pain referred to the region of the left kidney. The pain was severe and was accompanied by nausea, vomiting, chilly sensations and constipation. The duration of the attacks was from twenty-four to forty-eight hours, he had observed that during the continuance of the pain the quantity of urine voided was notably diminished, the attacks ended suddenly and the disappearance of the pain was accompanied by the passage of a large quantity of urine.

Soon after the attacks had commenced he had observed that during the continuance of the pain a palpable tumor mass formed in the left hypochondrium. At first the attacks occurred about once a month, but they gradually increased in frequency until at the time of his admission to the hospital they occurred about once in ten days. The tumor increased in size with each recurring attack. On February 5, 1908, he came under the care of Dr F W Murray in the New York Hospital, who made a diagnosis of intermittent hydronephrosis, and operated upon the patient the same day. Upon exposing and palpating the kidney, a diagnosis of fused kidney was made. The hydronephrotic sac was opened and drained. It contained more than a quart of bloody urine. The sac was drained for a month through a tube. The tube was then removed and the sinus was allowed to heal. Following the operation the patient's ureters were catheterized with styletted catheters by Dr Alfred Taylor. Upon the left side the catheter was readily introduced its entire length, upon the right side the catheter passed easily for a few inches, when obstruction was met, upon further pressure, however, the catheter passed onward readily. An X-ray picture of the patient taken with the catheters in situ showed that the catheter in the right

ureter crossed the median line of the body to the left side in the mid lumbar region so that the upper ends of both catheters lay to the left of the median line. The patient left the hospital.

He was again admitted to the hospital on October 20, 1909, and came under Dr. Johnson's care. In the interval he had suffered from a number of attacks of pain etc., as before, the present attack however was very severe, the pain was of an agonizing character and was referred to the left hypochondrium and left lumbar region. Upon physical examination a distinct bulging could be seen in the upper left quadrant of the abdomen and upon palpation a firm tender reniform tumor could be felt occupying the entire left upper quadrant and the left loin. It was flat on percussion except where the colon crossed it in front. The patient was passing a very small amount of urine. At the end of twenty-four hours the pain subsided, the patient passed a large quantity of urine containing some blood and the tumor diminished in size and became less tense. Dr. Johnson operated upon the patient on October 23, 1909. The kidney was exposed by a long incision parallel to the ribs, it was separated from the peritoneum by dissection with the fingers so that its outer and anterior surfaces could be palpated. The organ was enormously increased in size and formed a dense firm mass. Upon its lower pole to the left of the median line, though partly in front of the bodies of the lumbar vertebræ, could be felt a firm rounded elastic mass about two inches in diameter. This mass plainly represented the right kidney. It was firmly fused with the lower pole of the dilated organ of the left side and was too small to carry on the entire renal function of the individual. In order to make sure of the true condition the peritoneal cavity was opened and a hand introduced to the opposite side of the belly, no kidney could be felt upon the right side. The wound was closed by suture and promptly healed. The patient left the hospital but soon returned very ill indeed. For forty-eight hours he had had anuria and was suffering great pain. Uræmic symptoms were absent. The abdominal tumor was greatly distended and tense. It was thought best to afford relief by draining the kidney. A small incision was made in the loin and the kidney was incised, the wall of the sac was half an inch thick and very tough and about two quarts of bloody urine was evacuated. The dilated pelvis and calyces were explored with the finger in the hope of finding

and extracting a stone, no stone was found, further exploration was prevented by very severe bleeding from the interior of the sac, which necessitated the packing of the entire cavity with gauze. The hemorrhage was so severe that strenuous measures were necessary, saline infusion, etc., to save the patient's life. The packing was removed after some days and a large rubber catheter inserted in its place. After the patient was able to be up and about the outer end of the catheter was closed with a clamp. The patient was able to keep himself dry and by removing the clamp to evacuate the kidney at suitable intervals. During the fortnight following the operation no urine was passed by the urethra, thereafter small quantities of urine were passed from time to time but most of the urine now escaped through the loin.

As yet the interior of his kidney had not become seriously infected and the patient was fairly comfortable. Dr. Johnson said he feared, however, that the outlook for this young man was unfavorable. He thought serious infection would sooner or later occur and destroy the patient's life.

DIVERTICULITIS OF SIGMOID

DR. JOHN A. HARTWELL presented two patients. The first patient was a man, 42 years old, who was admitted to the Presbyterian Hospital in the service of Dr. Eliot on April 21, 1909, suffering from an acute abdominal lesion.

Two days prior to admission this man had developed the typical symptoms of an acute intestinal obstruction, and these had increased continuously. He had vomited several times, and neither gas nor feces had been passed. For three or four days prior to the onset of the acute symptoms, he had noticed that his bowels were constipated, which was for him a very unusual thing.

Physical examination on admission showed that the abdomen was uniformly distended and tympanitic, excepting in the left flank, where there was a small area of dullness. About an inch inside of the anterior superior spine of the ilium and above it was felt an elongated mass, about the size of an apple, along the course of the sigmoid. This mass was tender, and above it the distended colon could be mapped out by percussion. Careful questioning failed to get any evidence that the patient had ever

been conscious of any abdominal lesion prior to the onset of his acute symptoms. With these however the pain was most severe at first at the site of the tumor.

Under gas and ether anesthesia a laparotomy was immediately done the peritoneum being opened over the mass. A walled-off abscess was found lying outside the sigmoid just above the pelvic brim which communicated with the lumen of the bowel through a gangrenous looking perforation. For a distance of about two inches the entire bowel wall was markedly thickened as was the mesentery connected with it. There were two adhesion bands kinking and pressing on the gut in such a way as to cause obstruction but it was noted that the colon as far as it could be seen above this point was not unduly distended. A primary resection of the diseased portion was done by the usual method with an end-to-end anastomosis. The abdominal wound was sutured with drainage.

The post operative course was unsatisfactory and the symptoms of obstruction increased rather than lessened. After twenty-four hours therefore the wound was opened and as the anastomosis did not look entirely satisfactory though the lumen was patent the stitches were removed and a Murphy button inserted. It was again noted that the colon above this point was not distended and it was believed that the paralysis of the bowel was so great that the obstruction would not be relieved. Accordingly a right iliac enterostomy was performed on the first loop which presented itself. This proved to be the jejunum high up so that later it had to be closed by suture.

Following the enterostomy the patient progressed toward recovery although he was hardly out of danger for a week owing to his toxic condition resulting from the intestinal obstruction. A small faecal fistula developed at the site of the sigmoid anastomosis but this closed spontaneously. It was necessary however to open the abdominal wound again to dislodge the Murphy button which had become fixed in the lumen of the gut at the brim of the pelvis. The gut was not opened for this purpose the button being pushed down through the intestinal wall so that it could be grasped by a finger in the rectum and extracted.

The pathological report made by Dr. Meakins on the section of the intestine that was removed was as follows:

The specimen consisted of a portion of the colon. At one point there was a slight depression from which an ulcerating channel led to the peritoneal surface. Microscopically, the section showed a muscularis and abundant subperitoneal fat, all of which was the site of chronic inflammation. A section taken across the mucous membrane through the entire tract of the perforation showed the mucous membrane and the other coats dipping down through the wall of the gut. First, the mucous membrane became ulcerated and disappeared, the muscularis continued farther, covered with necrotic material until it became thinned out and finally disappeared. Beyond this the subperitoneal fat alone remained, covered with necrotic material. For a considerable space around the sinus, all the tissues showed marked chronic and moderate acute inflammation.

Diagnosis. Diverticulitis, with chronic inflammation. Several other diverticula large enough to admit the point of a probe were found in the excised section of the colon.

This case, Dr. Hartwell said, illustrated a distinct type of the condition resulting from diverticulitis of the sigmoid. There were no symptoms whatever until the diverticulum, by its perforation, had set up a local peritonitis with abscess, and the resulting adhesions produced intestinal obstruction. The patient's convalescence, after the first operation, was complicated by the error in doing a primary resection and anastomosis. This, in the presence of an acute obstruction of the colon, should not have been done, because, as in this case, failure to relieve the obstruction frequently resulted. Since the lumen of the gut was not markedly narrowed, and since the condition was simply inflammatory, packing of the abscess cavity would probably have accomplished a cure. The fear, however, that the condition was either cancerous or tuberculous led to its removal, but even with this in mind a two-stage operation would have been better.

The second case shown by Dr. Hartwell was a man, 23 years old, who was admitted to the Presbyterian Hospital on August 9, 1909.

When he was ten years old, he had some form of gastro-intestinal trouble, with blood in the stools. There was no history of pain nor vomiting. He was in bed only two weeks, but was unable to attend school for six months. From that time on he enjoyed good health until May, 1906, when he developed some infection of the lymph-glands on the right side of the neck. These became swollen and painful, but did not confine him to bed. During the night of May 20, without premonitory symptoms of a gastro-intestinal character, he was awakened with

nausea but no pain and vomited more than a pint of pure blood in the form of dark red clots. During the following two days he continued to vomit blood at intervals and on May 22 1906 he was admitted to the Presbyterian Hospital in Dr David Bovaird's service. Examination at that time showed enlargement of the lymph glands throughout the body. The right cervical glands were acutely inflamed and breaking down. The spleen was enlarged otherwise the abdominal organs were normal. A blood examination showed 2 300 000 red blood cells 23 500 white cells 82 per cent of polymorphonuclears and 30 per cent of hæmoglobin.

On May 30 the glands were incised and pus evacuated. Cultures showed sarcinæ and a large bacillus no pus organisms and no tubercle bacilli were found. On June 18 there were evidences of fluid in small amounts in both pleural cavities. The effusion disappeared spontaneously and when the patient left the hospital on July 9 1906 the sinus in the neck had not quite closed the red blood-cells numbered 3 816 000 and the hæmoglobin had increased to 64 per cent. The diagnosis at this time was gastric ulcer and cervical adenitis possibly tubercular though this was not proven.

From this time until May 30 1909 the patient enjoyed excellent health in every way. He worked regularly and showed no symptoms of any acute or chronic disease. On that night—after rather violent exercise during the day—he was suddenly awakened with vomiting of dark red blood. This was repeated several times and he felt sick and nauseated. The vomiting did not recur after that. He was admitted to the Bronxville Hospital where a routine examination by Dr Charlton disclosed a mass in the left lower quadrant of the abdomen. On close questioning the patient thought he had noticed this lump for some time.

When the patient came to the Presbyterian Hospital the abdomen was not distended but slightly more prominent in its left lower quadrant where there seemed to be a slight bulging on inspiration. There was no rigidity. In the left lower quadrant there was an oval mass 11 cm in length and 6 cm in width situated just above Ponpart's ligament and extending upwards and outwards from near the symphysis pubis towards the anterior superior spine. This was dull on percussion its surface was hard and smooth non fluctuating it was adherent and appeared to extend down into the pelvis. It did not change in position

with the position of the patient, nor could it be moved from side to side. It was moderately tender. Upon rectal examination the mass was found to extend into the left side of the pelvis, and its lower section could be palpated as a hard, slightly irregular, tender mass. The percussion note over the entire abdomen was not as tympanitic as normal, especially in the regions over Poupart's ligament. There was slight dulness in the right flank, and the left flank gave dull tympany which changed to pure tympany when the patient turned on his right side. In the knee-chest position there was dull tympany in the epigastric region. These signs suggested the presence of a small quantity of free fluid. Peristalsis seemed normal. The rectal mucous membrane above the valves seemed congested, and there were a few pin-point areas, evidently inflamed follicles. The spleen extended for a distance of 4 cm. below the costal cartilage of the ninth rib in repose. It was firm, and descended with the movements of inspiration. A blood examination, made on August 20, showed 4,480,000 red blood-cells, 5,700 white cells, and 77 per cent of hæmoglobin. No acetone nor acid bodies were found in the urine. Tests of the fæces for blood were positive, but the patient was eating meat at the time. No ova, nor parasites.

During the patient's stay in the hospital his stools were repeatedly examined for tubercle bacilli, but none were found. No parasites, pus nor red blood-cells were ever present, though he gave a positive chemical blood test. The von Pirquette test was negative for tuberculosis, as was also the Wassermann for syphilis. The Cammidge reaction for pancreatic disease was also negative. During this period the blood gradually regained nearly a normal condition, the count showing 4,480,000 red cells, 5,700 white cells and 77 per cent of hæmoglobin. His pulse rate was about 70, and his temperature was practically normal. The local condition in the abdomen had not materially changed.

On August 21, 1909, under gas and ether anæsthesia, an incision was made in the left lower abdomen over the mass, and carried into the peritoneal cavity where the tumor was located. The abdomen contained a small amount of serous exudate. The large intestine, from the splenic flexure to the rectum proper, was found to be the seat of a marked uniform thickening involving its whole circumference. The wall was estimated to be about three-eighths of an inch thick, so that the intestinal tube was

rigid and hard but its lumen was not appreciably narrowed. At the splenic flexure the lesion had to a certain extent kinked the bowel causing a moderate degree of obstruction. The mesentery of the descending colon was thickened quite as much as the bowel itself. The spleen was soft and somewhat enlarged. No other lesions were found in the peritoneal cavity after a thorough examination and there were no evidences of tuberculosis. The adhesions which were causing the obstruction were loosened and the whole length of the descending colon was examined for the purpose of finding a perforation or some other cause for the condition at hand. The process gave all the appearances of a simple inflammatory thickening involving the bowel and its mesentery. As it was impossible to eradicate the disease the abdomen was closed with drainage.

A pathological examination of the peritoneal fluid showed it to be sterile. Microscopical examination of a small piece of tissue removed from the surface of the bowel showed it to be fat infiltrated with small round cells and extravasated blood. There was an increase of fibrous tissue and the walls of the blood vessels were thickened and their lumen contracted. There was no noteworthy perivascular change and no evidence of either syphilis or tuberculosis could be found. The diagnosis made by the pathologist was chronic fibrous peritonitis.

The post-operative history of the case was uneventful. There was but little drainage from the wound and it healed kindly. Since the patient's discharge from the hospital on September 10 he had been attending to his work and was in excellent health. There was still present a mass in the left lower abdomen which had not materially changed since the operation but had given rise to no symptoms whatever.

The diagnosis in this case Dr. Hartwell said must still remain in doubt. All the evidence pointed to the condition of the colon as being one of a simple inflammatory process involving the coats outside of the mucous membrane. Tuberculosis and syphilis both involved the mucous membrane and gave symptoms of such involvement. Cancer could be ruled out by the extent of the disease and the subsequent good health of the patient. These exclusions together with the microscopical findings justified the diagnosis of simple pericolicitis and perisigmoiditis and mesen-

teritis All these conditions arose from diverticulitis, as had been amply demonstrated both by previous writers and by the specimens here presented, and the speaker said he therefore felt it proper to include this case as one of probable multiple diverticulitis

SUBPHRENIC ABSCESS FOLLOWING ACUTE APPENDICITIS

DR WILLY MEYER presented a girl, 12 years old, who came under Dr Meyer's care on September 24, 1908, on the fourth day of an attack of acute appendicitis, the original symptoms of which had been rather uncertain When the speaker first saw her the symptoms were such as to demand an immediate operation Upon opening the abdomen, the omentum was found covering a gangrenous appendix like a cap The appendix was removed and a cigarette drain inserted into the pelvis, which had been filled with pus The patient made a good recovery, but on October 5 the temperature, which had been slowly rising, indicated the presence of pus, and two days later she had a severe attack of coughing and expectorated pus The temperature now was 106, with an extremely weak and rapid pulse Examination showed dulness over the right lung posteriorly, with absence of pectoral fremitus and an area of tympanitic sound anteriorly at the level of the eighth intercostal space Here an incision was made and through this a large amount of stinking pus and air escaped The air rushed in and out as in operations for empyema It was believed that a pleuritic septic effusion due to an embolic lung affection had been evacuated A rib was then rapidly resected, and the wound drained

This operation failed to improve the patient's septic condition The fever was still elevated, and she continued to expectorate pus She was taken to the roof garden, and kept in the open air day and night About this time she developed an abscess below the liver which was opened and drained, and from which for a long time there was a discharge of foul pus Later the first chest incision had to be enlarged and a larger piece of the eighth rib resected to insure continued good drainage It then became evident that Dr Meyer had opened into an acute subphrenic abscess which had perforated through the diaphragm into the bronchial tree The patient was subsequently sent to the mountains and finally made a complete recovery

RESECTION OF THE SIGMOID FOR MULTIPLE DIVERTICULA

DR A V MOSCHCOWITZ presented a woman 40 years old who was operated on eleven years ago by another surgeon for what were supposed to be tubercular glands of the neck. In June 1902 she was operated on by Dr Moschcowitz for an extensive packet of varicose veins upon the right lower extremity. In October 1904 she was operated on for acute gangrenous appendicitis and about three months later for a right femoral hernia. In the intervals of these operations she had been in the hands of competent internists for stomach trouble and she also complained of pain in the left iliac fossa with tenesmus and the passage of mucus and blood. Upon palpation of the abdomen a sausage-shaped mass could be outlined in this region; it was hard and in view of the patient's emaciated condition it raised a strong suspicion of carcinoma.

The abdomen was opened by Dr Moschcowitz in June 1906 and at that time he made a diagnosis of multiple diverticulitis. The sigmoid flexure was very firm and contracted and there were numerous scars in the mesosigmoid showing distinct evidences of past inflammation. The shape of the bowel was like a double-barrelled gun, the coils being parallel to each other.

Subsequent to this operation the patient still continued to pass mucus and blood. She was operated upon again in March 1909, at which time a resection of the gut was done with an end to end anastomosis by suture. From this operation the patient, after a rather stormy convalescence, finally made a complete recovery and she had since enjoyed good health.

TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY

Stated Meeting, held January 3, 1910

The President, DR WILLIAM J TAYLOR, in the Chair

COMBINED CYSTOSCOPIC AND ROENTGENOGRAPHIC EXAMINATION OF THE URETERS AND KIDNEYS

DR ALEXANDER UHLE read a paper with the above title, which presented the results of work done by DRs PFAHLER, MILLER and MACKINNEY in conjunction with himself See page 546

DR PFAHLER remarked that although it is generally supposed that the diagnosis of ureteral or urinary calculi is comparatively simple, this is not the case There are a great many confusing shadows In at least half the cases the plates must be repeated to be sure of what has been found Ordinarily, when they are repeated, one can be sure, occasionally, however, shadows still occur that are almost impossible to diagnose positively, although here, as in every line of work, experience comes into play

DR FRANCIS T STEWART said that he had recently been pursuing a similar line of inquiry, using leaded catheters and collargol 2 per cent In his series of cases the capacity of the pelvis of the kidney ranged from 3 to 18 c c It seems that if one gets an adventitious X-ray shadow, one can be almost sure with these methods of examination whether it is or is not a urinary calculus, but frequently the shadows of calculi do not show on plates In four instances at least he had been able to recover a stone from the ureter, usually by oil injections, in cases in which the stone did not show on the plates Phleboliths may often be felt through the vagina or rectum A few years ago he showed before the Academy some X-ray plates of phantom ureteral calculi As to the dangers of ureteral catheterization he feels

that he should not keep silent in view particularly of a case which he recently examined for Dr Mitchell. After catheterization this patient had absolute anuria for a day and a half at the end of that time urine was again secreted and the patient recovered but for a time it looked as if the result might be fatal.

DR JOHN B. DEEVER said that there was no doubt that in a certain class of cases calculi cannot be diagnosed by the λ ray alone and all must see the importance of the introduction of the catheter and the λ ray taken under the circumstances. The question of the risk attached to distending the pelvis of the kidney will become less as one becomes more expert in manipulation of the catheter. He called attention to one case which Dr Pfahler had shown in which a stone was removed from the ureter extraperitoneally at a time when a hysterectomy was done for fibroid uterus the patient made a good recovery. That case would probably not have come to operation for ureteral calculus had not the diagnosis been made by the λ ray and verified by catheterization.

DR ORVILLE HORWITZ said that he had had one experience in which the injection of silver solution employed by Dr Uhle caused anuria which persisted for about twenty four hours causing great anxiety. He had never seen suppression of urine following a simple catheterization although he was aware that this complication had been encountered by other observers. All had had the experience of passing a catheter past a partial obstruction caused by impacted stone. When this condition persists a diagnosis of stricture is usually made until Rontgenographic examination reveals the presence of calculus. It may not be uninteresting to call attention to the fact that ureteral catheterization or Rontgenographic examination may give wrong information thus leading to a mistake in diagnosis. In a certain proportion of cases no matter how skilfully or gently the catheter may be manipulated the examination causes a hemorrhage which makes it very difficult to determine whether the blood in the urine is due to traumatism or to a pathological cause.

Dr Uhle has pointed out that when an λ ray picture reveals a shadow alongside or in the course of the ureter it is frequently difficult to decide whether it is a phlebolith or calculus. He had an experience of this kind once with a patient who had a calculus causing an obstruction of the ureter located at the brim of the pelvis. It was with difficulty that the catheter could be made to

pass the co-arction, the Rontgenographic examination was negative. Believing that the obstruction was caused by stricture, an exploratory examination was performed which resulted in quite a large urate stone being removed from the ureter. It is now well known that this rare form of calculus does not throw a shadow and consequently an X-ray picture in such cases is negative.

DR ALEXANDER UHLE (in closing) said that, in regard to the dangers in the passage of the catheter, he had seen anuria on numerous occasions follow the passage of the catheter alone. In none of the cases he had observed was there any vomiting or any apprehension about the patient's condition. After allowing catheters to lie *in situ*, the kidneys, at times, fail to act for two or three hours, and the passage of a catheter through the ureter will occasionally cause hemorrhage even under normal conditions. A catheter left for any length of time in the ureter will cause some bleeding, not observable in the urine, but cystoscopic examination made two or three days later will show a small blood clot coming from the ureteral opening. This is ordinarily mistaken for tumor, and on two or three occasions the patients have been catheterized later and tumor suspected. Even normal patients used for experimental purposes will show slight hemorrhage.

In regard to diseased kidneys with symptoms all referred to the bladder, he had observed such cases. In tuberculosis the patient may complain of only frequent urination, all symptoms pointing to the bladder, but cystoscopic examination will show the bladder apparently normal.

DR PFAHLER added, in answer to the question of traumatism, that by the gravity method of injection one can fill the ureter and pelvis of the kidney by passing the catheter only a few inches into the ureter, which is a distinct advantage. He thought this method to be limited in its field of usefulness. The great majority of calculi can be diagnosed without this, and if so there is no necessity for taking any additional risk, it is only occasionally that one wishes to be more certain regarding calculi at the lower end of the ureter. One which came nearest to misleading him was a mole on the patient's back. This patient had persistent hæmaturia, he could find no stone in the kidney, but after repeated X-ray examinations he found a beautiful shadow of what seemed to be a stone about half an inch above the upper pole and lying to the outer side. When the patient was on the

operating table however he saw there was a mole on the back in just this location and so told the operator who however decided to go on with the operation but no stone was found and no cause for the hæmaturia yet the patient recovered

OPERATION FOR THE RELIEF OF AN INCURVATURE OF THE PENIS

DR ORVILLE HORWITZ read a paper with the above title for which see page 557

DR JOHN B DEEVER agreed with Dr Horwitz that the Otis dilating urethrotome is a dangerous instrument if not used judiciously He recalled one case of a doctor with a slight incurvation following an internal urethrotomy which he performed and after this he was very cautious in the use of this instrument He had seen slight incurvation a number of times occurring in the practice of others but never any reaching the degree of Dr Horwitz's case The incurvation though very slight in a nervous man is enough to make him very uncomfortable

The modification which Dr Horwitz suggests is most important—that is not to overdilate when the blade is drawn through the stricture This is particularly important advice for young surgeons who are about to take up the Otis instrument.

MERCURY SALICYLATE INJECTIONS IN SYPHILIS

DR MACY BROOKS read a paper with the above title for which see page 552

DR HILARY CHRISTIAN said that he had been all his life a most uncompromising opponent to the hypodermic treatment of syphilis for the reason that he had always felt that the introduction of the drug in this manner rose to the dignity of an operation involving the risk of abscess considerable pain and the danger of acute salivation but he had had lately an open mind on the subject owing to the experience he had had in his service at the Philadelphia Hospital and he had come to believe almost that the hypodermic treatment of an insoluble salt of mercury is superior to any form of internal treatment although he had never had any fault to find with internal treatment except when the patient got beyond control and run away He had seen in the wards of the Philadelphia Hospital such great results that he was compelled to come to the conclusion that there is probably a great future for the treatment of syphilis by the hypodermic introduction of an insoluble salt This salicylate of mercury used by Dr Gottheil

for ten years persistently with few if any abscesses and with absolute disappearance of all lesions, is entitled to some belief and respect

DR JOHN B ROBERTS said that he had had a little experience recently with the hypodermatic use of mercury in a case of tertiary syphilis. The patient has specific osteoperiostitis of the tibia, and was treated by him with inunctions of mercury, and mercuric chloride with potassium iodide internally in enormous doses by the mouth for seven years. Several operations for splitting the periosteum and boring into the bone were done. The pain was alleviated but not entirely relieved. Recently he had been giving her succinimid of mercury, one-fifth grain, hypodermatically once a week, and it is astonishing how quickly she had been relieved of her pain, and how little discomfort she has as compared with that resulting from the other treatments given by mouth.

DR THOMAS R NEILSON said that he had been very much impressed by the results in one or two precocious cases of syphilis in which mercury given by the mouth was not efficacious, but he would not like to subscribe to the routine treatment of syphilis by the hypodermic injection of mercury, the risk hardly seeming worth while. However, it is valuable to have such treatment when the introduction of the drug by way of the stomach does not prove of value.

DR ORVILLE HORWITZ said that at the present time most of the syphilographers are in accord in teaching that syphilis is best treated by administering a course of mercury for at least two and one-half years. Mercury should be given for a short period by mouth. This method should be interrupted every four to six weeks and either hypodermatic medication or inunctions substituted for about two weeks, which course is to be pursued during the entire time that the patient is under observation.

On return from a visit from the various venereal clinics in Europe in 1883 he found that hypodermatic medication and inunctions of mercury were relied upon as the standard method of treating the disease in determining the secondary or tertiary stage. He decided to investigate the hypodermatic method and after the study of one hundred and thirty (130) cases he read a paper giving the results of his observations before The County Medical Society which was afterwards published in the *Therapeutic Gazette* of May 19, 1894. The discussion of the paper gave rise to a most acrimonious discussion, and when the Society ad-

joined the majority dispersed believing that this method of treatment was dangerous unsatisfactory and one to be employed only in specially selected emergency cases Not discouraged by this adverse view of his confreres he had continued to employ the hypodermatic method as a means of treating syphilis for the past twenty six years and was fully convinced that when properly employed it is one of the strongest and most reliable weapons possessed by the physician wherewith to fight this disease

It is gratifying to find that the hypodermatic treatment of syphilis is rapidly becoming the standard method employed as a routine treatment by all progressive physicians

DR. BROOKS in closing the discussion said that the dangers of this method are very slight Embolism cannot occur if the operator takes sufficient time to be sure that the needle is not in a vein

The danger of abscess is very slight if the technic is carefully carried out and the injections given deeply Dr Gottheil claims to have only had one abscess in ten years and that happened in the case of a patient treated in a dirty tenement without aseptic precautions

A few deaths have occurred after the hypodermic injection of mercurial salts but these are extremely rare and it has not been proven that death was due to the fact that the drug was administered by hypodermic—some patients have a rare idiosyncrasy for mercury and cases are reported where death has followed its administration by mouth

Administration by mouth is very uncertain even when the patient takes his medicine regularly for the pills are often so old and hard that they pass through the alimentary canal undissolved

DILATATION OF THE PROSTATIC URETHRA FOR THE RELIEF OF THE SYMPTOMS OF PROSTATIC ENLARGEMENT

DR E HOLLINGSWORTH SITER said that the Bottini operation having been practically discarded the only procedure left for the relief of the prostatic symptoms is prostatectomy But there are so many cases that are not fit for the prolonged anesthesia and shock of prostatectomy that it seems some method should be devised for this class of patients

Three and a half years ago a patient upon whom he proposed to do a suprapubic prostatectomy did not do well with his ether

after he had opened his bladder, and he was led to try dilatation of his prostatic urethra with his finger. The results were so gratifying that he had since employed it frequently. This patient's urinary difficulties disappeared, and he heard from him recently that he had had no return of frequency and was not rising at night. His age was 65 years and owing to the fact that there had been no disturbance or injury of his ejaculatory ducts and vesicles, he had had no interruption to his sexual life.

He had since employed this procedure on some twenty cases and his results had so far been satisfactory in every way, not only as to relief of symptoms, but as to uninterrupted sexual life and no return of urinary disturbances.

The cases he had selected have been the "spread out" prostates, usually with cystitis and always somewhat run down from the effects of catheter life. He had tried it on two hard prostates but too recently (within eighteen months) to say how long the relief will last.

He had also tried combined removal of the "middle" lobe and dilatation, but these have also been too recent to estimate the permanency. He felt that this method was worth a long and continued trial. It can be employed under local anæsthesia as it is no more than a suprapubic cystotomy. There is no loss of blood, practically no shock, and the patient can be up and about in a few days. Where there is cystitis, he drains the bladder for two or three days suprapubically. Where there is no cystitis, he closes the suprapubic wound and drains through a catheter left in the urethra. The after treatment has consisted of a daily irrigation for ten days or two weeks, with urinary antiseptics by the mouth.

He thought dilatation had the following points to recommend it,—absence of shock, absence of interruption to sexual life, brevity of the operation, absence of secondary hemorrhage, quickness of recovery and absence of post-operative incontinence, and the fact that the operation can be done without waiting for the disappearance of a long continued and troublesome cystitis due to the catheter life so many prostatics lead before they come to operation.

Then again, the operation is so simple and safe that he would not hesitate to repeat in a few years or every few years, if there is no permanency to the relief, and there is a return of symptoms.

DR JOHN B. ROBERTS said, before prostatectomy was known

to be so successful and satisfactory much relief was given in some cases of moderate prostatic enlargement by the use of large bougies introduced through the urethra into the bladder. Retrograde dilatation through a suprapubic incision ought to be even more valuable and Dr Siter's remarks indicate its beneficial effect.

HYDATID CYST OF THE LIVER

DR FRANCIS T STEWART related the history of a man aged 19 years who was admitted to the Pennsylvania Hospital August 25 1909. For one year he had been suffering with epigastric pain indigestion and occasional attacks of vomiting. He had lost much weight. On admission he was extremely ill. The temperature was 105° F. the pulse rapid the skin moderately jaundiced and the mind clouded. A large mass could be felt and seen in the right hypochondrium and above this a secondary nodule close beneath the ribs. The mass was dull on percussion extremely hard and moved with respiration. neither fluctuation nor fremitus could be demonstrated. The leucocytes were 15,000 the urine bile stained turbid acid with a S.G. of 1011 a cloud of albumin and a few granular casts. As he had seen two somewhat similar cases which on exploration proved to be sarcoma of the liver he made this diagnosis and suggested exploration with the hope that he was wrong and that some condition amenable to surgical treatment would be found. In two days the temperature fell to normal and the patient was much improved. The abdomen was then opened and a hard whitish mass protruding from the convex surface of the liver disclosed. The secondary nodule previously mentioned was about one inch in diameter and not connected with the larger mass. it was excised to corroborate the diagnosis but on incision was found to be a cyst with a white lining and clear contents. The larger growth was then punctured and finally incised. it had an extremely hard and thick wall lined with a softer layer and contained about two quarts of fluid and white spherical daughter cysts ranging in size from a pea to a hen's egg. Scolices hooklets and cholesterol crystals were found in the fluid. The mother cyst occupied the right lobe of the liver and was about 10 inches longitudinally and 8 inches transversely. it was enucleated and the cavity painted with iodine sutured to the abdominal wall and packed with gauze. A large quantity of bile subsequently flowed from the wound but the cavity rapidly contracted and healing was complete in nine weeks.

BOOK REVIEWS

SURGICAL DIAGNOSIS By EDWARD MARTIN, M D, Professor of Clinical Surgery in the University of Pennsylvania Lea & Febiger, Philadelphia and New York, 1909

Since the responsibility of the early recognition of a surgical condition rests almost wholly with the attending physician, it is for his benefit and instruction that the work of Dr Martin has been written Just as a surgeon must be versed in medical diagnosis so must an internist be instructed in surgical diagnosis It is not necessary that he should be capable of making a minute and detailed diagnosis, but it is essential that he should recognize the transition from the medical to the surgical side Dr Martin says, "It often happens that when the disease is so fully developed that the diagnosis can be made beyond doubt, the time for surgical intervention is past" This should not be taken too literally, for there are many exceptions If, for instance, a cancer of the breast is not recognized as possibly or probably such until the dense induration, skin adhesion, nodular lymphatic glands and cachexia proves its nature, the only possible result, according to Martin, accruing to the patient is the knowledge that she will have but little time to live and that she will suffer much

The subject matter takes up first Laboratory Diagnosis, the writer does not go into the details of this subject, omitting the technic and explaining the importance of the examinations as applied to Surgical Diagnosis The second chapter, the application of the X-ray in Surgical Diagnosis, has been written by H K Pancoast, and adds an interesting but short treatise on the subject

With the exception of the chapter on Gynæcological Diagnosis, which is written by Dr Anspach, and the chapter on the Diagnosis of Nervous Affections, by Dr Wiesenburger, and a section devoted to the Eye by Dr de Schweinitz, the entire volume has been prepared by Dr Martin He presents the subject in a systematic, careful way, laying special stress upon

the symptoms of major and deciding moment. Each lesion is taken up and treated as a whole thus bringing out more prominently the associated lesions. The work is decidedly one for the general practitioner and student of surgery and in no part does it go into the finer details of special diagnosis. This is especially apparent in the department of Diseases of the Genito-Urinary system where our methods of examination have been revolutionized by the introduction of the cystoscope. The illustrations throughout are good.

SURGICAL DIAGNOSIS. By ALEXANDER BRYAN JOHNSON, PH. B. M. D. Professor of Clinical Surgery in the Columbia University Medical School etc. D. Appleton & Co. New York and London, 1909.

No one can expect to become proficient in surgical diagnosis without first having thoroughly mastered the essentials of the practical side of medical diagnosis. To suppose that a book on surgical diagnosis is for a student of medicine is as impossible as to think of taking up the higher branches of mathematics without first having mastered algebra and geometry. Dr. Johnson has been a student and teacher of surgery for nearly twenty-five years and during that time has spent most of his time in the surgical wards of Bellevue, The Roosevelt and New York Hospitals. During that time he was greatly impressed with the necessity of instructing the practitioner of general medicine with the essentials of surgical diagnosis for surgeons are constantly receiving patients who for days have been suffering from an acute or advanced surgical disease which has been unrecognized by the practitioner and the patient is found in a state of advanced disease where surgical intervention has become a matter of absolute necessity and where the chances of recovery are greatly minimized on account of the time lost by the practitioner in referring the case for surgical diagnosis. In order to present this subject in a comprehensive manner the author has thought it advisable to add some pathological data and many of the points which he has brought out are emphasized by illustrative cases.

VOLUME I treats of Wounds and their diseases. Diseases of the Soft Parts of the Bones. Tumors. Fractures and Dislocations. Syphilis. the X-ray. the Head and Neck. Thorax and

Breast, and Abdomen in general, the peritoneum and the special abdominal organs. This volume resembles somewhat the first volume of a general treatise on surgery in that the subjects are treated in a general way, bringing out the signs and symptoms of surgical diseases in general. The volume also contains a very valuable treatise on X-rays in surgical diagnosis, going into the minutest details of the apparatus, the technic, and the diagnostic value of the X-rays in injuries and disease. This, of course, includes its use in fractures, but in a general way.

VOLUME II is devoted to injuries and diseases of the Abdomen and its viscera, including the entire genito-urinary system. It is impossible to go over in detail the special points of interest in each section, but one remarks the especial interest and large amount of space which is devoted to surgery of the kidneys and ureter, and also the bladder. In some respects these chapters are the best that have ever appeared upon this branch of surgery which is rapidly coming to be of considerable importance. It is really the first work of a general character in which there has been any attempt to recognize the value of the American methods of examination and the superiority of American instruments in the diagnosis of kidney lesions. The illustrations accompanying these sections, while not always original, are well chosen.

VOLUME III takes up the Spine, the Nerves, the Pelvis and the Extremities, and contains also an Appendix which takes up some of the more recent methods of diagnosis that have been introduced since the earlier chapters were written.

The first chapters dealing with injuries of the Spine and Spinal Cord are well worked out, being in some respects a compilation of the writings of others adapted to surgical diagnosis. The consideration of diseases of the spine is less technical and more interesting.

The section on injuries to the Shoulder and vicinity is especially good, and the illustrations are both numerous and well chosen.

The author takes up a certain region of the body and describes in turn all of the surgical conditions which may arise there. This is a distinct advantage to the student and gives a much more comprehensive view of the subject. It is also more logical to consider the associated lesions as many of them occur in the same case. It makes less repetition.

Throughout this volume the bone lesions are given a prominent place. The X ray pictures and the numerous photographs of old bone lesions add greatly to the text. The extensive experience which the author has had in this branch of the work makes his opinion authoritative.

In discussing the injuries of the Wrist and Hand a great deal of space has been given to the consideration of the anatomy of the parts. All those who have had much of this work to do realize the importance of this addition for the proper conservative treatment of hand injuries and the avoidance of unnecessary mutilation often depends on the fundamental knowledge of the exact anatomy of this part.

About sixty pages are devoted to a study of diseases and injuries of the Knee Joint a subject on which volumes have already been written but the author has condensed the subject and presented it in a masterly way.

In considering the three volumes together we find that Dr Johnson has completed a work which must be considered as authority. His long and continuous service in New York hospitals and his close associations with many of the masters of surgery during its developmental period has fitted him for this task of which he has so well acquitted himself. He is to be congratulated on the completion of his work.

PAUL M. PILCHER

PREPARATORY AND AFTER TREATMENT IN OPERATIVE CASES

By HERMAN A. HAUBOLD M.D. Clinical Professor in Surgery and Demonstrator of Operative Surgery New York University and Bellevue Hospital Medical College New York etc. New York and London D. Appleton and Company 1910

The author of this book is one of those surgeons who understand the position of the general practitioner in regard to the patients who require the attentions of an expert which the practitioner can not give. He is also in sympathy with the physician who having studied his patient lived with him and discovered the necessity for operation at last sees him taken hold of by a man who operates takes his money and sends him back to his family or is responsible for having him placed in other

hands for further observation and treatment Dr Haubold believes that there should a closer co-operation between the family physician and the surgeon, that the former should understand the preparation of patients for operation, that he should have an intelligent appreciation of the operation, and that he should be able to conduct the after care of the patient He believes that the physician should be compensated for these special services, and that, if this were followed, the evils of losing his patient on the one hand or dividing the fee of the surgeon on the other would not come so much into play

It may be said by some, that, while this co-operation is desirable in certain instances, still in a large proportion of cases not only is special surgical skill required but the family physician is neither qualified by temperament, understanding or experience to be entrusted with any surgical responsibility, and that there is a further large proportion of cases in which the surgeon recognizes that there has been distinct culpability of treatment upon the part of the physician These matters are beside the mark because the author of this book takes the stand that the physician should be better educated in surgery questions than is now the case It is to this end that this book has been prepared, to make the physician a more competent ally of the surgeon

There are thirty-four chapters They deal with the essentials of preparation for operation, the patient, instruments, dressings, materials, solutions, assistants, and the operating room Then the treatment of the wound is taken up, suturing, drainage, dressing, stock, hemorrhage, postoperative complications, and feeding Operations in different regions are discussed, the head, face, neck, thorax, spine, abdomen, female pelvic organs, urinary organs, and extremities The text is illustrated with 429 pictures, all good and having practical application

It is observed that the author regards most men as alcoholics, and he does not seem inclined to withdraw their alcohol Diabetics he deprives of their wonten amount of carbohydrates The names of the manufacturers of instruments and materials appear with extraordinary frequency in the illustrations, and while they are those of well known and reputable firms, and are attached to the electrotypes evidently loaned to the author, the wisdom of accepting courtesies of this sort from commercial houses in the interest of economy is doubtful

It is satisfactory to find Pasteur referred to as the originator of the principles underlying surgical sterilization

This text was written perhaps before the introduction of clean catgut into surgery as German banjo and violin strings are recommended but fortunately as the result of recent agitation catgut is now being prepared especially for surgical purposes and a new era in the preparation of this important material has been entered upon

The administration of sterile foods as a preliminary to stomach and intestinal operations is given all too little consideration in practice and one of the strong features of this book is the practical and scientific presentation of this subject If the methods set forth in this work were adopted in every hospital it is fair to presume that the mortality in gastro-intestinal surgery would be distinctly lowered

In general it may be said of this book that it fills a place in surgery and should be a distinct help in bringing about a better preparatory and after treatment in operative cases While it deals with a wide field of surgery still it can not be said that it wanders from its text It displays the individuality of the author and above all possesses the merit of being useful

The publishers have done a good piece of book making The paper is better than is being given to most medical publications It is to be hoped that the book will find a large appreciation

J P WARBASE

URGENT SURGERY By FELIX LEJARS of Paris Translated from the Sixth French Edition by WILLIAM S DICKIE F.R.C.S Vol I New York William Wood and Company 1910

The author of this book does not mean by urgent surgery the surgery of injuries but that of conditions demanding immediate surgical action as distinguished from conditions which are distinctly not matters of emergency If this book has any especial mission it is to give the surgeon an understanding not only of the diseases demanding immediate surgical attention but the nature of the attention which they should receive and for the general practitioner it can perform the distinct service of informing him of the possibilities of surgery and remove from his mind the vague conceptions of what surgery may do for his acutely sick patient

A feature of the book is that the translator has not edited it, for which reason the reader is brought into immediate touch with the methods of one of the best of French surgeons

The introductory chapter deals with the equipment and the carrying out of emergency operations. As an example, the author takes the case of an operation required to be done in the country, in which there is extreme urgency with complete lack of necessaries. He shows the things of the household which may be used and how to use them for surgical purposes. This chapter deals also with anæsthesia of all types, infusions, and dressings

The rest of the book is divided into sections dealing respectively with the head, neck, thorax, spine, and abdomen. Vol. II, it is presumed, will deal with the extremities and the parts not included in this first volume. Much that is not found in the ordinary general surgeries is presented in these chapters. Thus the emergency surgery of the eye is well presented, and such operations as paracentesis of the anterior chamber, emptying the globus, and enucleation are described. The suturing of wounds of the eye is illustrated with good pictures

Tracheotomy and intubations would naturally be found well presented in such a work. The author deals with foreign bodies in the œsophagus and trachea in practical fashion. Most surgical literature treats of such foreign bodies as can be studied, and leisurely attacked, but it is true that many of these cases are of great urgency. The author displays an admirable activity in doing the thing for the patient's relief at once

Wounds of the heart, foreign bodies in the heart, and empyema, receive practical treatment without procrastination. In discussing injuries to the cord attention is called to the importance of the deep reflexes. "If the tendon reflexes are preserved, even partially, a complete irremedial lesion of the cord may be excluded, but their absence during the first few days is not in itself conclusive, as the loss may be transitory"

The keynote to the treatment of injuries to the abdomen is to operate in doubtful cases. In these cases, "when there is a disagreement between the pulse and the temperature, it is the pulse which must be believed". Having opened the abdomen, the author takes up each condition that may be encountered, and applies the best treatment. A variety of hypothetical conditions

are described more than will be found in the larger works on surgery. The surgeon who is familiar with this chapter will not be at a loss to know the approved treatment of any abdominal injury.

Under the section on the abdomen are found also wounds and rupture of the kidney, ureter and bladder. The urgent surgery of the uterus is also presented. This includes rupture of the uterus during labor. The author advises hysterectomy for the latter condition. The emergency operations upon the stomach and intestines are well described. Concerning appendicitis the author agrees with the general consensus of opinion of American surgeons.

This is a valuable book chiefly because of the large number of conditions, complications and combinations of urgent surgical diseases and injuries which it discusses. It has a distinctly French atmosphere. There are the French restlessness and energy, guided by the scientific intelligence which carries them to the mark. It is the surgery of the intensive life.

J. P. WARBASSE

A TEXT BOOK OF SURGERY For Students and Practitioners
By GEORGE EMERSON BREWER A.M. M.D. Professor of
Clinical Surgery at the College of Physicians and Surgeons
Columbia University New York Surgeon to the Roosevelt
Hospital etc. Second edition octavo 915 pages New
York and Philadelphia Lea & Febiger 1909

In this second edition of his book Dr. Brewer has treated his subjects in a less cursory manner. He has added new material and many excellent colored illustrations—this edition is two hundred pages larger than the first.

The first four chapters are devoted to inflammation and surgical diseases. The chapter on Tumors gives a definition of each of the growths we are in the habit of seeing; it gives also a suggestion as to treatment and is well illustrated. The chapter on Shock and its allied conditions gives a summary of our present knowledge on these subjects.

After chapters on Surgical Technic and Anæsthesia, which contain nothing new except perhaps the illustration of Sutton's apparatus for colonic anæsthesia, the author takes up the injuries

and diseases which are apt to occur in the different structures. The short article on neuralgia is perhaps the most satisfactory one in these chapters. Every subject is briefly reviewed and the author's individual method of handling the condition indicated. We find suggestions as to surgical technic which the author has evidently found of value in his large experience. After a brief review of injuries and diseases of the joints, the book gives us chapters on Fractures, Dislocations, Hernia and Amputations, and closes with a chapter on Deformities and their corrections.

Dr. Brewer has succeeded in this book in giving in a crisp, didactic manner most of the essential facts of surgery as it is practised to-day.

WILLIAM B. BRINSMADE

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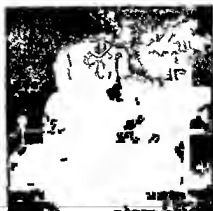
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MEDINAL

In the Muenchener Med Wochenschr of October 12, 1909, Dr E Steinitz writing from Prof Rostski's Division of the Stadt Krankenhaus Friedrichstadt in Dresden, (Germany), confirms his previously reported favorable results with Medinal (Mono-sodium-salt of the Diethylbarbituric Acid). The author's first article appeared in, "Therapie der Gegenwart," July 1908. He particularly emphasizes the prompt and rarely failing efficiency of Medinal when administered per rectum and recommends for this purpose the use of Medinal-suppositories. Surprisingly good results were obtained with Medinal in this form in Asthma bronchiale and Stenocardia, the nocturnal attacks being shortened and frequently entirely forestalled by its use, although this particular action of Medinal seemed to decrease after long and continuous administration and to necessitate gradual increase of the doses. Generally, Medinal-Suppositories will be indicated wherever small doses are desired and stomachal hypersensitiveness is to be reckoned with. The combination of Medinal with Morphine did not only prove useful in certain cases, but, according to extensive experiments of an American physician, Medinal appears to effectually counteract the disagreeable side-effects of Morphine. Neither from his own nor from the observation of others does the author feel justified in drawing definite conclusions regarding Medinal when administered subcutaneously and recommends further experiments with 15 grains in a 10% solution. Author then reviews a number of other contributions to the therapy of Medinal, the great majority of which concur in recognizing the superiority of Medinal over Diethyl-barbituric Acid. Munck, who has administered it, mostly subcutaneously, in conditions of excitement of the insane, dissents somewhat, but admits the more agreeable taste of the Medinal-solutions. Only when placed directly on the tongue, Medinal tastes strongly bitter, owing to its far greater solubility as compared with the Diethyl-barbituric Acid. Author recommends that hospitals and sanatoria keep stock solutions of Medinal (56 grains in ten ounces of water, one dessert spoon of which contains $1\frac{1}{2}$ grains). Addition of more water, or wine, flavors, Morphine, Codeine etc., if desired, should be made to the individual doses, not to the stock-solution, to avoid precipitates. Author has also experimented with the Mono-sodium salt of the Dipropyl-barbituric Acid

(solubility in water 1 : 3) which produces sleep on an average in ten minutes, its other characteristics being identical with those of Medinal. It is, however, not possible, as was

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It is now held that inasmuch as the mental states, such as hysteria and melancholia, which are frequently manifested at this period of life have for their exciting cause alterations of the sexual system, it is proper that their relief be accomplished by the employment of agents that exert an influence directly on these parts.

It is conceded that the sedatives mentioned do afford a certain measure of palliation, but experience seems to have proved that they are ultimately injurious rather than beneficial in action.

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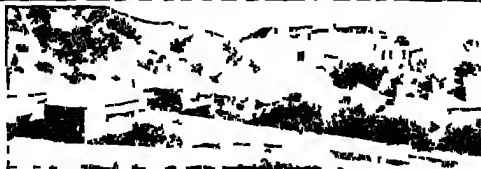
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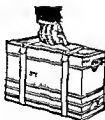
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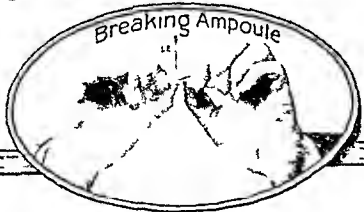
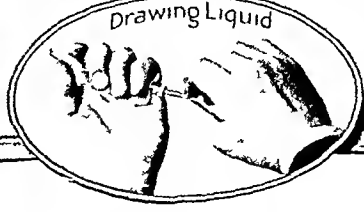


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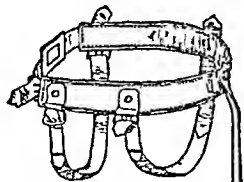
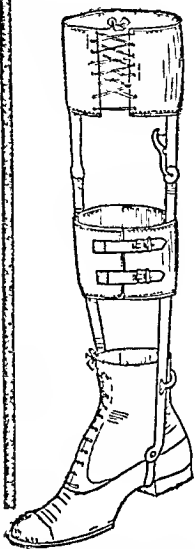
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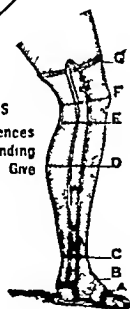
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ANNALS OF SURGERY

VOL XLIX

JUNE 1909

No 6

ORIGINAL MEMOIRS

THE SURGICAL TREATMENT OF LOCOMOTOR ATAXIA

BY LEGRAND N DENSLOW M D

OF NEW YORK.

(Th d P p)

It would perhaps be as well for the benefit of those who are still unacquainted with my theory as to the cause of locomotor ataxia to review briefly my second paper * read at a meeting of the New York Academy of Medicine October 1 1908

I am firmly of the opinion that the dystrophic changes that occur in the neurones of the posterior roots and their connections in tabes are the result of continuous sensory impulses conveyed from some peripheral point to the sensory roots in the cord That such continuous impulses kept up perhaps for years exhaust the central nerve substance which having no rest or intermission from such impulses and having no time or opportunity for recuperation finally succumb from exhaustion and take on dystrophic degeneration The changes found in situations other than the cerebrospinal such as the sympathetic and peripheral nerves are probably due to the force of the sensory impulse passing on through their spinal connections and expending their force at the points of least resistance as for example their terminations in the skin and muscles and

in the ganglia of the sympathetic I think this theory of damage done at the most vulnerable point well illustrated while the impulse is still in the direct line, in first destroying the neurone where it has lost its neuroglia in the posterior roots—at the “ring of Obersteiner”

This would account for the “tabetic degeneration being selective in character, unlike the Wallerian which affects all tissues indiscriminately, attacking in succession fibres and tracts of perhaps different function significance”

Prof Mathews of the Leland Stanford University has made observations that may explain the manner in which the dystrophic change takes place, and it certainly accords with the present theory It is known that the conducting nerve substance, or neurone, is a very simple tissue, almost protoplasmic, being a little more than highly phosphorized fats in a weak saline solution In other words, this portion of the nerve consists of colloid particles in suspension Prof Mathews found that when a nerve is stimulated electrically the colloid particles of these fats are precipitated, and that coagulation to a certain extent takes place

It has also been proven (Howell’s “Physiology”) that the effect of fatigue (either natural or artificial through electrical stimulation) is shown by histological changes, characterized by shrinkage of the nerve cell In the resting condition these cells are turgid with large round nuclei, whereas fatigued cells are vacuolated and shrunken, with corresponding changes in the nuclei It has been found that the amount of shrinkage increases in geometrical ratio to the length of time during which the stimulus has been allowed to act This would seem additional evidence that nerve impulses can, as the result of incessant irritation, produce the change I claim takes place

According to the views advanced by Edinger (*Med Klinik*, No 28, 1908), the fatigue or exhaustion induced by overwork of a healthy nerve, or simple use of a poisoned or degenerative nerve, may never be recovered from, so that the outcome is paralysis and atrophy

Syphilis is no doubt a prime factor in tabes, but only so far,

probably as it is responsible for a tissue condition necessary to render such tissue more susceptible to the continuous sensory explosions or impulses it is certain that other causes that have been supposed to be direct factors in the etiology of tabes such as exposure to cold overexertion and alcoholism are only so in so far as they lower the resisting power of the system in general and the nerve centres in particular Sexual excesses I think have a direct bearing where the irritation is in the genital tract by aggravating and perpetuating the points of irritation

From my experience during the past five years I am inclined to think that many cases of tabes other than those preceded by syphilis are directly caused or rather precipitated by some injury or shock In all cases where such injury or shock appeared to be the starting point of the disease there was found to be urethral lesions which had evidently existed for a long time In these cases the spinal cord was able under normal conditions to defend itself against this irritation but after the shock consequent upon the injury the cord apparently at once succumbed to the influences from the urethra

The initial irritation it is believed may be in the urethra bladder and rectum of both sexes and also in the uterus and appendices in the female Eyestrain and intestinal putrefaction are certainly factors that must not be overlooked when searching for the initial peripheral irritation The well known astigmatism due to ataxia of the ocular muscles in cases of tabes frequently is corrected upon the relief of the peripheral irritation It is interesting to note in connection with rectal irritation that a prominent Boston surgeon has reported to me the case of a woman where great improvement in her ataxia gait took place immediately following a rectal operation although at the time of the operation there was no intention of relieving the tabes the operation being done solely for relief of the rectal irritation

In the following cases as in my second paper the peripheral irritation was found to be situated in the urethra and bladder and the lesions found varied from slight local to

general irritability, with erosions, with and without contractions and simple irritation of the bladder, with or without incontinence of urine and fæces, or both. In each case as far as possible all the resources of surgery were brought to bear, changing from time to time as seemed best to suit individual requirements. No hard-and-fast rules can be laid down, nor are they necessary to the skilled surgeon.

As it has been thought I did not express myself definitely enough in my last paper as regards treatment, I would say that the first essential is to clear the urethra of all contractions, operating and dilating whenever necessary, and to treat locally per urethroscope, any erosions or sensitive conditions, whether local or general. I do not think it matters much what the application is so long as it is mild, it may be either zinc, copper, a simple boracic acid solution, or any of the milder antiseptic detergents. In passing I would say that during the past twenty-five years I have never used argent nitrate in the urethra.

A careful and definite diagnosis must be made of the condition of the urinary tract, and an equally careful aseptic course of treatment carried out until it is put into as nearly a normal condition as possible. A word of warning may be permitted when the deep urethra and bladder are to be invaded even for examination, not only on account of the well-known danger of infection and shock, but from the knowledge the writer has that cases of tabes have a special sensibility to the slightest access of irritation at this point, I would state that the line between relieving and producing still more irritation is a narrow one, and that careless manipulation would probably be followed by an aggravation of symptoms, probable precipitation of crises in cases where they have occurred before, and the possibility of an even more embarrassing situation, rather than cause for mutual congratulation. This special sensibility of these patients to the slightest access of irritation leads me to incline more strongly, if possible, to the belief that this method of treating tabes is correct in those cases where the source of irritation is found to be in the male bladder and

urethra The importance of urinary analysis before commencing treatment to determine more particularly whether renal diseases or diabetes is present will be appreciated The lesions most generally found are erosions and contractions which have probably existed for years and which by producing continuous irritation keep up such a constant succession of sensory nerve impulses as to cause the dystrophy found in the posterior roots of the cord

The object of the present paper is to report cases that have occurred in my practice during October November and December 1908 where the interest lies particularly in the promptness of relief from symptoms which had persisted in many instances for years prior to the present surgical interference

CASE XVIII—W S H October 5 1908 Male age 62 Duration of disease ten years History syphilitic General condition good Using cane gait fully one quarter from normal Pain moderate twice a month lasting for twenty four hours Romberg Westphal and A R symptoms present also girdle symptoms Anæsthesia general right arm more marked Restless and sleepless nights Examination revealed contractions in first third of the urethra middle third bleeding and granular Anterior contractions cut and rest of urethra treated locally per urethroscope with boracic and zinc solutions until normal October 15 1908 Gait improved also general anæsthesia October 29 1908 Sleeps well gait practically normal girdle symptoms gone February 5 1909 Patient practically normal as to gait balance sensation and sleep No pains since October Advised to go abroad and to report in three months

CASE XIX—M H S October 8 1908 Male age 54 Duration of disease five years No history of syphilis Weight 10½ General condition poor Helpless unable to stand alone but can walk when supported by two attendants has been in this condition for fourteen months Pain very severe for five years occurring every month and lasting from one to several days Romberg Westphal and A-R symptoms present Incontinence of urine Difficult urination Vision poor Slight anæsthesia and analgesia general Cannot locate legs in bed Examination revealed contraction of the urethra at one and one half inches

lower third erosions and sensitive Treatment Contraction cut and rest of urethra treated same as in last case October 22, 1908 Incontinence of urine stopped November 16, 1908 Walked alone in house for first time in fifteen months, urinates freely for first time in five years January 25, 1909 Takes daily walks of several blocks, with assistant Vision much improved April 2, 1909 Continued improvement in general health and strength No incontinence of urine Vision normal Can walk about the house alone all day and out of doors for half a mile accompanied by an attendant Balance regained No pain for months Weight 126, a gain of 21 pounds

CASE XX—K L, October 10, 1908 Male, age 38 Duration of disease thirteen years No history of syphilis Weight 155 General condition fair Gait 50 per cent off, has used cane for thirteen years Romberg, Westphal and A-R symptoms present Pains severe two or three times a week Anæsthesia and analgesia general Unable to hold cup in hand Incontinence of urine for past month, before that up two or three times a night to urinate Examination revealed contraction in anterior and middle third of urethra, with erosion Treatment Contraction cut and dilated, and erosions treated per urethroscope as in previous case October 25, 1908 Walked to office without use of cane November 3, 1908 Incontinence stopped and not obliged to get up at night to urinate Can hold cup to mouth March 30, 1909 No pain for months Balance greatly improved Bladder normal since November 3, 1908 General sensations greatly improved, almost normal

CASE XXI—R L A, October 13, 1908 Male, age 42 Duration of disease six years Syphilis eleven years ago Weight 140 General condition good Gait 50 per cent off for past six months Romberg, Westphal and A-R symptoms present No pain Anæsthesia of feet, slight general analgesia Difficulty in urination, dribbling Examination revealed contraction in anterior third and erosions in middle third of urethra Contraction cut and erosions treated per urethroscope November 15, 1908 Sensation in feet returned, walking greatly improved and dribbling of urine stopped February 20, 1909 Gait and sensations practically normal Urinary functions normal

CASE XXII—C H G, October 15, 1908 Male, age 40 Duration of disease two years Syphilis seventeen years ago

Weight 145 General condition good Gait unsteady Romberg Westphal and A-R symptoms present Pains daily for two years Anæsthesia of both feet Dribbling of urine Sexual absent Examination revealed contraction in anterior third and in lower third with erosions and sensitiveness Anterior contractions cut lower partially cut and dilated and erosions treated per urethroscope October 20 1908 Sexual returned gait improved walks steadily dribbling stopped December 1 1908 Pains very moderate and only occasional March 30 1909 Patient is normal as to gait sexual and functions of bladder Discharged going abroad

CASE XXIII—B W October 17 1908 Male age 50 Duration of disease thirteen years Syphilis eighteen years ago Weight 193 General condition good Gait 75 per cent. off and loss of balance for at least four years Very marked nervousness unable to go about without attendant Romberg Westphal and A-R symptoms present Severe pains once or twice a month Anæsthesia general slight analgesia slight Great difficulty in urination Incontinence of fæces after cathartics or when diarrhoea Great pressure and bearing down in rectum Examination revealed contraction in anterior and lower third of urethra with erosions in deep urethra Contractions cut and dilated and erosions treated per urethroscope November 6 1908 Great improvement in general nervous condition and bladder No pain since operation January 18 1909 Walks in house without cane best in five years April 3 1909 General condition fine No longer nervous Comes long distance by rail once a week for treatment Walks with ease with cane Pain very seldom mild and fleeting Pressure and bearing down in rectum stopped Bladder practically normal

CASE XXIV—B M H October 18 1908 Male age 46 Duration of disease thirteen years No history of syphilis Weight 140 General condition poor Gait about 25 per cent off Romberg Westphal and A-R symptoms present Very severe pain once or twice a month and continuous for two or three days Anæsthesia of hands slight Hyperæsthesia of second right toe General weakness very marked with almost sleepless nights Examination revealed contraction in anterior third also numerous contractions in lower half with erosions throughout most of the urethra Anterior contractions cut lower dilated and erosions

treated as with others November 14, 1908 No pains for three weeks Hyperæsthesia in second toe stopped immediately after operation General condition of strength markedly improved December 13, 1908 Still greater improvement in general health No pain, has gained seven pounds in weight February 15, 1909 Practically well, no pains, no longer nervous, sleeps well all night, general strength normal, has resumed occupation and has been travelling two to three thousand miles a week for the past two months

CASE XXV—D W, October 20, 1908 Male, aged 39 Duration of disease four years No history of syphilis Weight 150 General condition and nutrition fair Gait off fully three-quarters Is unable to stand alone over two or three minutes without assistance Romberg, Westphal and A-R symptoms present Pains moderate once a month Anæsthesia and analgesia of legs and feet Urination difficult and incontinence of urine frequent Unable to stand or walk in dark Examination revealed a succession of contractions with erosions throughout the lower two-thirds of the urethra The contractions were dilated and later erosions treated per urethroscope October 24, 1908 Urination normal, no incontinence Can walk in dark November 9, 1908 Comes to office alone Can walk in moving car Can go up and down stairs without aid of the hand rail On November 12, 1908, was in night railroad wreck and walked with aid of lantern two miles December 7, 1908 Can stand alone an hour at a time at his work March 30, 1909 In better health than for five years Gait practically normal, attends to all his ordinary vocations with ease Sensations much improved Bladder functions normal

CASE XXVI—B C J, October 23, 1908 Male, age 55 Duration of disease eight years Syphilis fifteen years ago Weight 117 General condition fair, gait 50 per cent off for two or three years Romberg, Westphal and A-R symptoms present Pains about twice a week, moderate for three years One year ago pains increased to very severe about twice a week Anæsthesia and analgesia of legs and arms Incontinence of urine day and night for three years Can write only with great difficulty, and if hurried cannot write at all Examination revealed lower third of urethra markedly contracted, upper two-thirds slightly, and lower half of urethra eroded Anterior one-

third incised lower portion dilated and same treatment per urethroscope November 3 1908 Handwriting greatly improved can write with ease November 10 1908 Incontinence day and night stopped Sensations returned to legs below knee November 28 1908 Pains relieved December 1 1908 Walk improved April 2 1909 General health greatly improved as is also walk Writing with ease Sensations much improved and bladder normal No pains since about the middle of last November

CASE XXVII—C L October 24 1908 Male age 39 Duration of disease fourteen years No history of syphilis Weight 185 General condition fair but in very nervous state Gait 50 per cent off normal and for past year has been obliged to use a cane Romberg Westphal and A-R symptoms present Pains very severe for fourteen years occurring two to three times a week lasting ten to twelve hours for the past eighteen months the pains have been excruciating and of daily occurrence lasting the better part of the twenty four hours General analgesia and anaesthesia more particularly in feet Incontinence of urine during the day Examination revealed contraction in lower third of urethra and entire urethra in exquisitely sensitive condition bleeding on touch Treated by incision dilation and applications per urethroscope November 4 1908 Pains daily but not so intense Incontinence of urine stopped Gait improved January 10 1909 Pains stopped for past week No return of incontinence Gait almost normal April 7 1909 Has been without treatment for six weeks No pain for past three months Gait practically normal can walk with ease without cane bladder function normal

CASE XXVIII—W W October 25 1908 Male age 40 Duration of disease two years Syphilis twenty years ago Weight 118 General health very bad was referred to me from a sanitarium with prognosis that probably would not live a month Romberg Westphal and A-R symptoms present April 22 1908 Became unconscious and continued so for three days since when he has been in very weak condition Gait has been three quarters off normal for past year For two years up to six months ago frequent gastric crises lasting twenty four hours past six months crises daily During June and September crises lasted ten days at a time Very nervous condition will sleep until 2 A M

every night, then wake and constant vomiting until morning. One year ago diplopia which lasted six weeks. From April until August, 1908, incontinence of urine and faeces. At present dribbling during day. Pain, confined to legs, excruciating for two years, occurring every two weeks and lasting twenty-four hours. Analgesia of arms and legs, also slight anæsthesia. Examination revealed contraction at one inch and several contractions in lower half of urethra. Treated by incision of anterior contraction and dilation of lower with usual applications per urethroscope. October 31, 1908. No gastric crises since operation, appetite good, general condition improved. January 4, 1909. After a dinner followed by ice cream, vomited three or four times at three o'clock the next morning. March 27, 1909. No vomiting since operation, except once due to error in diet. January 4, 1909. General condition very good, gait but slightly off normal, balance nearly normal, bladder normal, weight 127 pounds, a gain of nine pounds.

CASE XXIX—T J, October 30, 1908. Male, age 35. Duration of disease four years. No history of syphilis. Weight 148. General condition good. Gait 50 per cent off normal and unable to walk in dark. Romberg, Westphal and A-R symptoms present. Pain severe for three and one-half years, then no pain for six months, the last ten days constant pain daily. Analgesia and anæsthesia both present but not marked. Incontinence of urine frequent. Examination revealed contraction in anterior third, also in lower half of urethra. Treated by incision of anterior and dilation of lower contractions, with usual applications per urethroscope. November 28, 1908. No pain since operation, gait much improved, balance better, can walk in dark, incontinence of urine stopped. December 25, 1908. Was obliged to return home, general condition and sensations much improved, gait greatly improved, no pain since operation.

CASE XXX—H O C, November 10, 1908. Male, age 48. Duration of disease seven years. Syphilis twenty years ago. Weight 143. General condition good. Gait not quite normal. Romberg, Westphal and A-R symptoms present. Pain severe for one year two or three times a month often lasting for two days. Analgesia general marked, anæsthesia slight. Incontinence of urine for one year. Examination revealed contraction in anterior third with sensitiveness and erosions in middle third.

Treated by incision in anterior third and applications lower portion per urethroscope November 20 1908 Gait practically normal marked relief of pain November 30 1908 Practically no pain for past month Incontinence stopped March 24 1909 Gait normal apparently in perfect health no pain bladder normal

CASE XXXI—B H R November 15 1908 Male age 47 Duration of disease six years Syphilis twenty years ago Weight 113 General condition very poor and emaciated Gait 50 per cent off normal has been growing worse during past two years Romberg Westphal and A-R symptoms present Pain excruciating for six years two or three times a week lasting twelve to twenty four hours with occasional gastric crises Analgesia and anæsthesia general Incontinence of urine and fæces when cathartic is taken Examination revealed contractions at one inch and in middle third Treated by incision dilatation and application per urethroscope December 1 1908 Balance practically restored no pains January 13 1909 Balance normal general health greatly improved has gained four pounds in weight first in ten years No pain since operation March 9 1909 Practically well so far as locomotor ataxia Feeling stronger and better in every way Advised to go to southern California

CASE XXXII—B H J November 30 1908 Male age 48 Duration of disease ten years No history of syphilis Weight 131 General condition bad Gait markedly affected due to Charcot disease in right hip has been using crutch for past two years Romberg Westphal and A-R symptoms present Hands numb pains severe for six years two or three times a week duration six to twenty four hours for past two months very severe daily almost continuous day and night Was taking ten to twelve powders of some coal tar product a day Gastric crises severe three years ago and again seven months ago Girdle symptoms for eight years Analgesia and anæsthesia general Examination revealed contractions in middle third of urethra with erosions in lower portion Treated by incision dilatation and urethroscope locally December 17 1908 Pains relieved February 8 1909 Pains entirely relieved also gait can walk without discomfort with cane Evidently the treatment has had a marked effect upon the Charcot joint in relieving the discomfort there

CASE XXXIII—F C December 14 1908 Male age 47 Duration of disease three months Syphilis twenty two years

ago Weight 198 General condition fair, but practically carried in and laid on couch, is helpless, unable to stand, has no use whatever of his hands One month ago could stand but not walk, has had to be fed for past month Incontinence of urine and faeces during past month Romberg, Westphal and A-R symptoms present Has had pain during past month, moderate in legs, occurring at night Analgesia and anæsthesia of legs and feet, arms and hands Examination revealed marked contractions in first and middle third of urethra, with erosions and bleeding December 17, 1908 Contractions incised and dilated December 20, 1908 Was able to get out of carriage and walk into office alone, also able to move fingers of both hands December 28, 1908 Walks about with ease without cane, incontinence of urine and faeces stopped, much improvement in right arm and hand, left also better January 15, 1909 Gait practically normal, hands and arms improved, sensations improved March 1, 1909 Right arm and hand now practically normal, left improved, is a retail liquor dealer and can attend to his ordinary work of mixing drinks Pupils react to light, Argyll-Robertson symptom no longer exists This is the first case where I have been successful in curing this condition Success is probably due to the very short time during which the disease had existed when he presented himself for treatment This case was referred to me by Dr Joseph Manning of the Hudson Street Hospital, New York, and the condition of the patient as described above has been verified by him before and after treatment April 9, 1909 There is continued improvement in all directions, gait, hands, arms and sensations normal, pupils respond perfectly to light For past six weeks has been getting up at 4 A M and attending to his business until 11 A M, after that visiting his place of business once or twice a day Yesterday was on his feet attending to his work from 4 A M until 7 P M

CASE XXXIV—N H J, December 26, 1908 Male, age 57 Duration of disease ten years No history of syphilis Weight 178 General condition poor, very nervous Gait has been one-third off normal for five years Romberg, Westphal and A-R symptoms present Pain severe for three years, three or four times a week, lasting from six to twelve hours, for past year pain at night has been almost continuous Analgesia and anæsthesia general slight, hands marked anæsthesia Incontinence of urine,

up two or three times a night for three years Incontinence of faeces for past year nights almost sleepless—when sleep occurs it is accompanied by horrible dreams January 5 1909 Examination revealed contraction slight in middle urethra lower third sensitive with erosions Treated by incision dilatation and application per urethroscope January 20 1909 No pain since operation balance and gait improved incontinence of urine and faeces stopped March 30 1909 No pains balance gait and sensations markedly improved Bladder and bowels normal No more nervousness sleeps all night general health good

Of the eight cases sent me by Dr Starr from the Vanderbilt Clinic College of Physicians and Surgeons New York the good results of seven of which were verified by Drs Starr and Cunningham on September 23 1908—the eighth case not having reported for examination to Dr Starr—six cases are all doing well and in very much better condition than in September all being still able to work and attend with ease to their usual vocations the seventh case has never reported for examination having gone to Italy in September the eighth case has been lost sight of not having reported for treatment for three months when last seen was doing well Case XII—one of the cases from Vanderbilt Clinic reported in my second paper—is of particular interest from the fact that when he came to me on July 15 1908 he had no use of his hands and there was almost complete atrophy of the muscles of the thumbs At this date these muscles are restored to normal size and function and for the past three months he has resumed the playing of the banjo and the violin He has never had any recurrence of any of the symptoms reported relieved October 1 1908

It may be as well for me to say that outside of the ordinary cathartics and urotropin and a quinine and iron tonic I do not use any drugs I have never given mercury iodide of potassium or strychnine in a case of tabes neither have I ever used electricity

From still further experience with tabes I am more firmly convinced than ever that the following conclusions stated in my second paper are correct

1 That peripheral irritation can produce pathological change in the central nervous system by creating continuous nerve impulses which exhaust the substance of its nerve centres

2 That the peripheral nerve degenerations of tabes are probably due to the same impulses carried on past the central system expending its force upon the points of greatest vulnerability or least resistance

3 That symptoms occur in certain cases of tabes with a severity out of all proportion to the actual pathological change that has taken place in the nerve centres, and that such symptoms are caused by the initial change creating a zone or aura of irritability beyond such change, which extends to the cerebrum, cerebellum, and sympathetic, and at times appears to cover almost the entire nervous system, including that of nutrition

4 That removal of this causal irritation resulting in recovery from such grave symptoms, as loss of balance, ataxia, incontinence of urine and fæces, anæsthesia and hyperæsthesia, etc., would appear to indicate the existence of such zone of functional irritability beyond the actual pathological change

There appears to have been much misconception as to what I claim for my treatment of tabes. Any permanent pathological changes that may have taken place in the spinal column or other portions of the nervous system are of course irreparable, and in that sense a cure is out of the question, but where a train of symptoms is undoubtedly due to a continued irritation of these lesions, and this irritation is stopped by removal of the causal peripheral irritation to the extent of relieving the patient permanently of the train of symptoms, such as pain, incontinence of urine and fæces, balance, gait and sensations restored, it would seem as if, so far as the patient is concerned, he has obtained what he sought—relief from his troubles. Practically he is cured, pathologically he is not

TRAUMATIC ASPHYXIA *

WITH REPORT OF A CASE.

BY DUNCAN L. DESPARD M D

OF PHILADELPHIA

THE term traumatic asphyxia has been applied to the series of phenomena following the suspension of the respiratory function for a more or less prolonged period by forcible compressure of the thorax or abdomen or both. These consist of the usual symptoms of suffocation associated with a peculiar mottled bluish discoloration of the skin of the face and neck sometimes extending to the upper part of the thorax and occasionally to one or both arms accompanied by subconjunctival hemorrhages and frequently bleeding from ears nose and pharynx

An interesting case of this type was admitted to the Jefferson Hospital January 28 1908 in the service of Prof John H Gibbon to whom I am indebted for the privilege of reporting the case

CASE REPORT—Male age 27 a mulatto At 4 45 P M on the date of admission he was on an elevator the sides of which were unenclosed and which was used for moving merchandise from the cellar to the sidewalk. The top of the shaft was closed at the street level by two iron doors which were usually open. When the elevator approached these doors the patient found them closed and becoming alarmed attempted to jump off of the elevator. In doing so he was caught between the moving elevator floor and the beam supporting the upper framework of the shaft in such a manner that his head neck the right part of thorax the right arm the leg and right side of abdomen were under the beam while the corresponding parts of the left side of the trunk arm and leg remained on the floor of the elevator his face being

* Read before the Philadelphia Academy of Surgery March 1 1909

directed downward The line of compression extended from the left side of the base of the neck to the right lumbar region He remained in this position about five minutes, and when found his face was said to have been almost black,—eyes bulging, mouth open, and tongue protruding He was completely unconscious when rescued On admission to the hospital at 8 30 P M he was still unconscious Respiration 18, regular but sighing, pulse 82, fairly full and regular, increasing in rate to 96 beats per minute in a short time

The examination of lungs and heart showed nothing abnormal There was a dislocation of the right sternoclavicular articulation Both arms were apparently paralyzed Over the forehead, face, neck, and extending to the right shoulder anteriorly and posteriorly, were what seemed to be small ecchymotic spots, dark red in color, which did not disappear on pressure and were separated by normal skin These areas were well marked over the upper part of the thorax and the left shoulder There were also a few slight abrasions over the right shoulder Both eyes showed marked subconjunctival hemorrhages

About ten minutes after being sent to the ward he had a convulsive attack, shrieking with each expiration, throwing himself about, and at times raising himself in bed, as if struggling for air, apparently having difficulty in breathing This condition lasted about ten minutes, he then became quiet with normal respirations

It was noticed during the attacks that his arms took no part in his muscular efforts, and hung limp at his sides, and that when his name was called loudly he seemed to hear, turning his head and eyes in the direction of the sound

He remained unconscious for seven hours, during the first part of which the convulsions were repeated at half-hour intervals, the periods between the attacks gradually becoming greater and the attacks lessened in violence and duration

January 29, 1908 The urine examination showed it to be clear, sp gr 1030, acid in reaction—no reaction to test for sugar, slight cloud of albumin, a few hyaline casts and no blood

The patient seems to be only partly in possession of his mental faculties, and could give no account of the accident He did not complain of pain, was quiet, and slept a greater part of the time

Examination by Dr Wm M Sweet the same day showed the eye-grounds to be normal, and during the examination it was noticed that his eyes followed the light, as if he could see it

January 30 1908 The patient's mind was much clearer and he remembered vaguely that he was in some way injured by an elevator. His appearance was much the same as the previous day. Palsy of both arms seems to be complete with exception of the power to move the fingers of the left hand.

February 6 1908 Examination by Dr Francis A. Dercum was as follows. Flaccid palsy of right forearm. The shoulder is only moved by special shoulder muscles. The pain temperature and tactile sense is present. Faint response to biceps tendon reaction. Stereognosis of the right side is lacking but normal on the left. Sense of position impaired at the wrist and unimpaired at the elbow. There is no tenderness over the nerve trunks. Electrical reaction. Little response on either side to Faradic current. Galvanic current showed no sign of reaction of degeneration of facial spinal accessory perineal or ulnar nerves. The extensors and flexors of the forearm around anus and legs are normal: *i. e.* no reaction of degeneration.

February 10 1908 The patient was able to flex and extend the fingers of the right hand and February 18 he was able to flex and abduct the arm to a limited degree. In other respects his recovery seemed complete. The hyperæmic spots having entirely disappeared gradually fading and not undergoing the chromatic changes usually seen in extravasation he was allowed to leave the hospital but returned to the out patient department for electrical treatment. In about six weeks from the date of discharge he had fairly well recovered the use of the right arm but there was still some muscular weakness.

Tardieu in 1870 made very extensive studies upon this subject drawing information from the observation of the victims of a panic occurring on the Place de la Concorde in which 30 persons were injured (with 9 deaths) and those of Prof Hardy where a number of women were injured by a stampede from a workshop caused by the falling of a part of a wall as well as quoting the studies of M. Olliver of Anvers upon those injured in the Champs de Mars in the year 1837 of whom 23 died. All those injured presented practically the same symptoms only varying in degree consisting

of unconsciousness, brief or prolonged respiratory and cardiac depression, sometimes with pulmonary engorgement which was characterized by a cough and moist râles associated with bloody expectoration, and all without exception exhibited a reddish-violet, or even black, discoloration of the face, neck, in some cases extending up to the upper part of the chest and occasionally to the arms, possessing the appearance of minute ecchymotic spots, at times so numerous as to be almost confluent. Sub-conjunctival hemorrhages were common to all and a few bled from the mouth, nose or ears. In none was there delirium, convulsion or paralysis, a few who were thought to be suffering from apoplexy when first seen, disproved this upon regaining consciousness. The post-mortem findings of 9 cases of Tardieu and at least as many of Olliver (Beek states 16) were uniform, and consist briefly of pulmonary congestion and frequently pulmonary apoplexy. Ecchymosis existed under the serous surfaces of lungs and heart and emphysema from rupture of air vessels. Among the characteristics most common was increased fluidity of the blood, which was dark in color, and its accumulation in the chambers of the heart, especially in those of the right side. Tardieu emphasizes the integrity of the brain in the two cases in which he was allowed to open the cranium, and states that Olliver in only a single instance found a considerably bloody exudate on the surface of the cerebral hemispheres. It is of interest to note that Tardieu has known similar symptoms and ecchymotic areas in women following prolonged labor, and in an epileptic, upon whom he made an autopsy.

More recently the following cases are found in the literature

HUERTER reports two cases, the first a boy, fifteen years old, was injured by being caught in a threshing machine, resulting in a penetrating wound of abdomen about 3 cm long, through which intestines protruded. He was not unconscious when seen an hour after the accident, the face was swollen, dark blue in color, and showed a number of petechiæ, the edges of which were irregular. This condition extended over the entire face to the edge of the hair and below from the cricoid cartilage to the nape of the neck the margins of the discolored area were sharply defined.

The eyes showed marked sub conjunctival hemorrhages there were also hemorrhages from the nasal mucous membrane The bluish discoloration lasted for a period of twenty four hours but the arterial hypæmia persisted for three days and gradually faded There was no injury to the head or chest.

The second case presented by this author was one of Vogt's which occurred in a boy aged fifteen who was run over by a wagon in a soft sandy road He was unconscious for a brief period and when examined shortly after the injury was found to have a contusion of the abdominal wall which was not very marked The eyes were bulging and the face and neck presented the same appearance of the above case. There was no injury to the head Recovery took place in about three weeks

PERTHES records two cases that of a boy fourteen years of age who was injured in a cotton mill being pushed into a space about two hands breadths wide between a wagon and the handles of a cylinder the wagon also struck the right side of his face. He was unconscious when rescued but shortly afterwards regained consciousness Subsequently he stated that in the first hour after the injury he could hear all that took place around him but could not see When examined one hour after the accident he was found to be a weak poorly nourished boy—conscious pulse regular and strong face blue except the lower half of the right cheek which was pale the blue color did not disappear on pressure Within the blue area were numerous dark red petechiæ the latter were also present over the upper half of the left side of the neck There was a slight exophthalmus and sub conjunctival hemorrhages There was no sign of injury to the head and no hemorrhage from the nose or ears The facial nerves were uninjured and the pupils of the eyes reacted to light The left clavicle was fractured at the junction of the middle and outer thirds Pain was elicited in the mid axillary line over the third and fourth ribs by pressure which almost developed ereptus Respirations were frequent but regular On the third day the temperature ran to 38 centigrade without any apparent cause the pulse varying between 76 and 96 beats per minute By the fourth day the discoloration of the skin was decidedly less but the sub conjunctival hemorrhages did not disappear for several weeks

The second case was that of a male aged thirty six years who was crushed between a wagon and an iron post the force acting from before backwards The man was held suspended with his left fore arm imprisoned between the wagon and fence In this position respiration was suspended and while retaining consciousness he could see and felt as if his eyes were going to pop out. His hearing was unimpaired. Respirations were rapid shallow and painful The entire face and especially the temporal region was swollen and colored a bluish red this was very marked in the region of the lower eyelids There were sub-conjunctival and scleral hemorrhages On the upper part of the neck were isolated petechiæ. No evidence of injury was found on the head, thorax or lower part of left chest where there was pain No other sign of injury was found with the exception of a compound fracture of the

radius On the third day after being hurt, the temperature rose to 39° , and there was bloody expectoration, with impaired resonance râles on the left side over the area that had previously been painful The temperature increased for four days, but in ten days all of the signs of pneumonia had disappeared This condition Perthes calls compression pneumonia The discoloration had largely disappeared by the fourth day, but that of the conjunctiva persisted until the thirty-ninth day after the date of injury The eye grounds were examined on the eighth day and found to be normal

BRAUN describes the case of a male twenty years of age, who was injured by a stone wall falling and pinning him to the ground, so as to compress the thorax and abdomen for half an hour The neck and face were not injured The examination of the patient showed the face to be swollen and of a dark blue color, the eye-balls were prominent with sub-conjunctival hemorrhages, especially marked in region of the palpebral fissure The pupils were dilated and did not react to light. Later a large number of ecchymotic spots appeared, distributed over the face, neck and left arm He complained of abdominal pain, but had no other symptoms of visceral injury The patient was at all times conscious with normal pulse and temperature By evening the ecchymosis was more pronounced, the pupils were still dilated, but reacted to light slowly The urine was normal except for the presence of albumin, which persisted for two days The eye grounds were normal on the day following the injury There were no unfavorable developments, and the patient left the hospital on the fifteenth day, with the face still swollen and with evidence of blood extravasation still well marked

BURRELL and CRANDON record a case of a male twenty-two years old, who was compressed by having his chest caught between an electric car and a door-post, for three minutes On examination one hour after the accident, he was found entirely unconscious Pulse 100, respirations 30 and shallow, with a groan at the beginning of expiration, the hands and nose were cold, bleeding from both ears, nostril and mouth There was no wound of the head Pupils small, equal, and did not react to light, excessive chemosis Reflexes present, but diminished with the exception of the knee jerks, which were absent Emphysema was present in region of the seventh, eighth and ninth ribs on left side, which obscured the localization of a probable fracture Slight spasms of the abdominal muscles were noticed There was a bluish discoloration over the face, extending into the scalp, over the neck and on to the chest as far as the third rib Pressure over this discoloration only produced slight paling, the former color returning slowly upon withdrawing the pressure A careful examination of these bluish areas showed that there were spaces of healthy skin 5 to 1 mm in diameter, evenly distributed throughout its extent These were limited by an illly defined bluish border, uniting to form a network. This condition was found to involve the mucous membrane of the lips to a limited extent There were marked sub-conjunctival hemorrhages confined to the parts not covered by the eye-lids Small retinal hemorrhages were present The patient improved and consciousness

returned in four hours. Urine contained albumin and blood but was normal in a few days. Vision was still imperfect on the third day. By the fifteenth day the discoloration began to grow less and by the eleventh day had almost disappeared but it did not pass through the usual changes of extravasated blood.

BEACH and COBB published an interesting case which occurred in a well developed male thirty years of age who was crushed by an elevator and subjected to pressure for three to five minutes. He was conscious for a few minutes and bled from nose and mouth. When examined one hour after the accident, he was in a condition of moderate shock. The eighth and ninth ribs on left side in axillary line were fractured and in this region the presence of subcutaneous emphysema was noted. The skin of the abdomen was contused and hematoma was found in the left loin and back near the pelvis. The face was bluish in color the skin seemed to be dotted with numerous black or reddish black areas between which the skin was normal in appearance. The discoloration extended over the neck terminating in a well defined transverse line passing outward from the inner ends of the clavicles posteriorly the bluish black discoloration was confined to the area overlying the trapezius muscles. Pressure over the discolored area did not cause it to fade completely.

The eyes were bulging and there were marked subconjunctival hemorrhages pupils were equal and reacted to light. There were no retinal hemorrhages. Mind was normal.

On the third day the temperature rose there was blood expectoration and pulmonary rales this disturbance lasting twenty four hours. The microscopic study of sections of skin removed from the neck comprising some of the dark areas showed the skin to be normal with no evidence of blood outside of the blood vessels.

HENRY records a case of a young man twenty years of age who was crushed between two iron pillars. He was unconscious for a short time. When examined the face neck and upper part of chest anteriorly were cyanotic. There was bleeding from both ears but not from the nose or pharynx. Marked subconjunctival hemorrhage of both eyes was present. The mind was clear and the patient complained of pain in the head thorax and legs. There was a tenderness over the lower dorsal region in both groins. A perineal wound was found. This wound healed without suppuration. There developed a compression pneumonia with a right sided emphysema from the pus of which the pneumococcus was isolated. The patient failed to recover and at the autopsy the right lung was found to be collapsed and the left lower lobe partially so. There were several abscesses of the right lung and some of the branches of the pulmonary artery of both lungs were thrombosed. He never recedes that the patient recovered from the traumatic asphyxia, but died from sepsis entering the perineal wound.

WINSLOW narrates the incidents of an accident to a young man twenty two years of age who was bent forward between the ceiling and an ascending elevator compressing the abdomen and thorax. There was no loss of consciousness but there was marked bluish punctiform dis-

coloration of face and neck as far down as the collar line, or on a level with the cricoid cartilage. The discoloration did not fade on pressure, and gradually disappeared without the usual changes seen in true ecchymosis. The microscopic examination of the skin removed from the discolored area, "showed the capillaries in places more or less distended with blood, but no blood was found anywhere in the tissues outside of the blood-vessels."

The appearance of a child thirteen years old, after being caught between the cow-catcher of a cable car and the ground, is described by ROBERTSON. There were some abrasions of the thorax and thigh, his face had a peculiar bluish-black tint, with a great many minute reddish-brown spots squirming through it. Pressure did not affect it. There was a distinct line of demarcation at the level of the middle of the clavicles, below which the skin was normal. The color gradually faded, and at the end of eighteen days there was only some duskeness of the face.

REPPANNER has collected from Wilm's clinic four cases, two of which were women injured in a panic following an outbreak of fire in a theatre. The area of the discoloration was not limited to the neck, but extended to the upper part of the thorax, and in one case to the upper arm, while in the other both mamma were the site of the characteristic discoloration. Both were unconscious, but became very restless and were given morphine to quiet them. The following day they had regained consciousness, but could not recall what had taken place at the time of their injury. His other two cases were men, one of which was crushed between a wall and a great weight, for about one minute. His face, neck and upper part of the thorax showed the dark red punctate area usual in these cases.

The other man was rolled by a tram car, his head and chest were free from the car. He was unconscious for a short time and sustained a fracture of the femur. The face was discolored by small punctate hemorrhages. The eye-lids were swollen and discolored, while the whites of the eyes were not visible on account of the sub-conjunctival hemorrhages. The palpebral conjunctiva and mucous membrane of the mouth showed the punctate hemorrhagic areas. The neck was free from the discoloration, but on the chest there was a triangular area corresponding to the part exposed when the shirt is open at the top.

BEATSON presents a case resembling that of Winslow's in which a man twenty-four years old was bent down and forward by a pit cage. There was intense congestion of the head and neck, petechial in character, but not affected by pressure.

RYERSON describes the condition of a boy who was injured by being compressed between the springs and wheels of a wagon. There were abrasions behind the right ear, forehead, abdomen and the left thigh. His face and neck had a deep blue mottled appearance in front and behind, shading into normal skin at the upper part of the thorax. The discoloration was not influenced by pressure, and in the course of two weeks had faded without going through the usual color changes of extravasated blood.

BOLT presents the case of a man thirty-eight years old whose abdomen

and lower thorax were crushed between two cars. The skin of face and neck became a violet blue with the exception of a line corresponding to the position of the rim of his stiff cap which was pressed well down upon his forehead at the time of the accident. This line was normal in appearance. The patient was semi-conscious realizing what was going on about him but helpless and temporarily losing the sense of sight, which returned in fifteen or twenty minutes.

Compression pneumonia developed but seemed to reach its maximum in a few days. The patient however died almost twenty-seven days after the injury from causes that were not clear even after an autopsy was performed. Microscopic examination of section of the discolored skin, showed in some places an effusion of blood outside the capillary vessels. The number of red blood cells thus situated were relatively small.

ERTINGER has been able to collect from the literature 36 cases and enrolls a case of his own which was that of a young man who was knocked down and trampled upon by a mob. He was unconscious for about an hour. There was oedema, or swelling and cyanosis of face and neck. Hemorrhages in skin of face, neck of the conjunctiva also in the mucous membrane of the nose, mouth, fauces and of the tympanic membrane and blood was found in the urine. The evidences of dilatation of the right side of the heart were present. The symptoms of pulmonary disturbance were present from the first and later a left-sided pneumonia developed.

In this form of suffocating not only is the air prevented from entering the lungs by their inability to expand but the contents of the thoracic vessels may be forced out and in the case of the veins the current is reversed overcoming the valves and damming the blood back into the capillaries. If the force acting is sufficiently great it is conceivable that the capillary vessels would be dilated to a point where paresis would ensue.

Beach and Cobb advanced this view and their microscopic studies seem to be conclusive proof of its correctness. This is further supported by the fact that pressure over the discolored surface caused only some paling in color and that it did not pass through the characteristic changes marking blood extravasation as seen in other traumatisms. Perth believes the limitation of the discoloration to the face and neck to be due to the absence or incompetency of the valves of jugular and facial veins. The fluidity of the blood and its dark color upon which Tardieu and Olliver lay so much stress is explained by Draper who attributes it to the withdrawal of

atmospheric oxygen from the blood and thereby lessening its coagulability, but he does not believe this to be peculiar to any special form of asphyxia, and states that it occurs in any case where atmospheric air is prevented from entering the lung

Sub-conjunctival and retinal hemorrhages, and hemorrhages from the mucous membrane of the nose and pharynx, may be explained by the lack of support the capillary vessels receive from the surrounding tissue, in comparison with the capillaries of the skin, where they are surrounded with the dense fibrous tissue of the corium. This leads to the speculation as to what the condition of the smallest vessels of the brain may be, and whether the slow return of consciousness and the tardy resumption of the mental functions in some cases, is not directly traceable to a paresis if not of rupture of some of the capillary vessels of the cerebrum.

Beck quotes Olliver, that in all cases where the conjunctiva was swollen by infiltration of blood, and in those where blood had flowed from the ear, the vessels of the pia mater and of the substance of the brain were engorged with blood.

In the absence of more definite cerebral symptoms, it cannot be stated with any degree of certainty that a similar condition of the blood-vessels of brain prevailed in the case under discussion, or whether the occurrence of convulsions and their repetition was in any way attributable to circulatory disturbances of the brain or medulla, from this source.

It is, however, well understood that spasms are produced by depriving the respiratory centres of their normal blood supply, as by compression of the great vessels of the neck, or they may be brought about by irritation of these centres, dependent upon an increased carbodioxid content of the blood, thereby lessening the supply of oxygen.

The probability of the convulsions being due to the formation of toxins arising from faulty metabolism, induced by the condition of asphyxia, has been suggested. The early appearance of the convulsions after the accident militates against this hypothesis.

I am inclined to attribute the occurrence of convulsions as due to respiratory interference. This may have been occasioned by injury to the phrenic nerve or its communicating branches as the area in which the nerve is situated lies directly in the line subjected to the greatest compression.

The loss of muscular power in both arms probably is best explained by the injury of the spinal nerve trunks. The pressure must have been more or less oblique at the base of the neck and with sufficient force to overcome the natural protection afforded by the sternoclavicular articulations. The greatest injury to the nerves appeared to be on the same side as the sternoclavicular dislocation.

The treatment of this condition is directed to the re-establishment of respiratory function such as artificial respiration, oxygen inhalations, atropine and strychnia, and when the right side of the heart is dilated, venesection is indicated.

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A CASE OF STASIS CYANOSIS FOLLOWING AN EPILEPTIC SEIZURE, SIMULATING TRAUMATIC ASPHYXIA ~

BY E G ALEXANDER, M D,

OF PHILADELPHIA,

Visiting Surgeon to the Out patient Department of the Episcopal Hospital

THE following case clinically resembled traumatic asphyxia so closely that I was at a loss how to classify it. Etiologically it was undoubtedly due to epilepsy, and this fact has forced me to describe the condition as a case of stasis cyanosis following an epileptic seizure.

E B, American, male, age 18 years, occupation, electrician, family history good.

Previous history. Had measles and whooping-cough in infancy, typhoid fever at the age of twelve. In the fall of 1906 while at work, a fifteen-pound wrench fell from a scaffold twenty feet high, striking him on the head in the left parietal region, he was rendered unconscious from the blow for a few minutes. On regaining consciousness, he continued his work for about one-half an hour, then, owing to intense pain and headache, went to his family physician for treatment. The wound inflicted was a trivial one, the skin not being broken, and from which he entirely recovered within a few days.

The patient was perfectly well until September, 1907, nearly one year after the injury, when he was seized with an attack of epilepsy. In October, 1907, and January, 1908, he had similar attacks.

Present trouble. On the morning of March 4, 1908, he was called to a meat market to repair an electric meat-grinding machine, after finishing his work he was seized with an attack of epilepsy and fell to the floor. Two witnesses of this attack said that the patient had just finished his work and was standing behind the counter talking when he suddenly let fall a hammer from his hand, straightened up, stared across the room as if

* Read before the Philadelphia Academy of Surgery, March 1, 1909

seeing something in the distance and then slowly sank face down ward to the floor. They also said that he puffed and snorted like a steam engine and they believed that he would have smothered if they had not turned him over. During this seizure no convulsive movements were noticed nor did he foam at the mouth. He was carried in an unconscious condition into an adjoining room here the light was much brighter and they noticed that his face was blue and that his eyes were blood shot. He remained unconscious several minutes. A patrol wagon was summoned the patient was taken to the Episcopal Hospital and admitted to the surgical dispensary. He was transferred from the dispensary to the house and admitted to the service of Dr G G Davis to whom I am indebted for the privilege of reporting this case. On admission to the dispensary the patient had fully regained consciousness and the history he gave was that while standing on a table doing some electrical work he received a shock which caused him to fall from the table to the floor after which he remembered nothing. (I have been unable to substantiate this history. The two witnesses were seen separately and gave almost identically the same account of the accident. The current was turned off during the repair of the machine so that it is highly improbable that the man who now remembers nothing of the accident could have received a shock.)

On admission to the hospital the patient complained of nothing but the discoloration of the face and eyes.

Examination—A young adult well nourished and apparently in good health. The face and neck showed a diffuse bilateral bluish and slightly punctiform discoloration of the skin that disappeared but slightly if at all on pressure. This discoloration stopped with a decided line of demarcation just where the collar passed around the neck. (The patient was wearing a tight collar when the accident occurred.) Below this line the skin was of a normal color. The lips showed a purple discoloration. The tongue was moist and clean and showed no evidence of having been bitten. There was no hemorrhage from the nose or ears. The eyes showed a marked subconjunctival ecchymosis more marked in the left the pupils being widely dilated and failing to react to light. This was due to atropia which had been instilled a few days previously for the purpose of testing the vision. The eye grounds showed no fundus change. The chest and abdomen

failed to show any signs of recent injury The heart and lungs were apparently normal Examination of the head failed to reveal any scar, depression or injury, either recent or old

Urine—Specific gravity 1020 Reaction, acid Trace of albumin, no sugar, a few granular casts, leukocytes, squamous epithelial cells and urates

March 6, 1908 Line of demarcation more pronounced than on admission Subconjunctival ecchymosis more marked Patient's general condition good

March 8 Discoloration of face beginning to fade Ecchymosis of conjunctiva still intense

March 11 Discoloration gradually fading

March 18 Discoloration has almost disappeared

March 22 The patient had an attack of epilepsy

March 24 Patient discharged and referred to the Orthopædic Hospital for treatment

Through the kindness of Dr Sinkler, to whose clinic the patient was admitted at the Orthopædic Hospital, I have examined their records and find the nervous history obtained almost identical with the above The patient was treated at the Orthopædic Hospital for eight months, during which time he had no attacks of epilepsy The parents of the patient told me that on his discharge from the Episcopal Hospital, they noticed that his face still showed a faint bluish discoloration

Spratling¹ states that "punctiform hemorrhages covering one side of the face and neck are not infrequent after grand mal attacks in certain individuals, this condition is noticed as soon as the fit is over, the face having a dark, diffusely mottled appearance without elevation, the discoloration partly disappearing under pressure to quickly return when it is removed, as a rule, such extravasations are visible for some days afterwards, first fading in changing colors like a bruise"

That the face suffers most, Spratling attributes to "constricting bands of clothing about the turgid neck, which increases the efforts of the mechanical congestion"

Echeverria² reports a case in which a general petechial eruption on the face, neck and limbs, followed diurnal attacks of petit mal and nocturnal spasm, the eruption following the



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nocturnal spasm was minute and confluent in character and generally passed off within two or three days

Pierce Clark reports a case of profuse subcutaneous hemorrhage on the right side of the face and neck following epilepsy

Gowers³ states that after the tonic spasm has lasted a short time ten or twenty seconds the face becomes congested and cyanotic but with the increasing remission of the spasm air becomes changed in the lungs and the cyanosis lessens

Aldren Turner⁴ says that hemorrhages petechial and of large size have been described as occurring under the skin of the face eye lids and neck during the cyanotic stage of fits but these must be unusual in uncomplicated cases of epilepsy

Oppenheim⁵ calls attention to the fact that minute rupture of the capillaries of the skin and mucous membrane or circumscribed hemorrhages of the conjunctiva may occur

Tardieu in performing an autopsy upon an epileptic, found a great number of small ecchymoses at the base of the neck and anterior part of the chest analogous to the *tache de purpure*

The above case I believe to be unique It differs from the cases referred to by the authors quoted in distribution duration character of discoloration and manner in which it disappeared

In Spratling's and Clark's cases the eruption was limited to one side of the face and neck In Echeverria's case there was a general petechial eruption—the discoloration however disappearing in two or three days In this case the discoloration was bilateral and lasted over a fortnight I am unable to form any accurate conclusions as to duration except in the cases referred to by Gowers and Echeverria In the former's cases the cyanosis disappeared in a few minutes after muscular relaxation was obtained while in the latter's case it lasted for two or three days Spratling states rather indefinitely that the condition may persist for some days afterward

The discoloration described varied from the transitory

cyanosis of Gowers, the petechial, confluent, and minute eruption of Echeverria, to the punctiform hemorrhages of Spratling Spratling says that the cases fade "in changing colors like a bruise" This was not true in the above case, the condition simply faded gradually without the characteristic changes of extravasated blood being absorbed With the fading the punctate character of the eruption became more pronounced

I am inclined to believe the factors producing this condition similar to those causing traumatic asphyxia, namely, a fixed thorax, a closed glottis, an increased intrathoracic pressure, a lack of æration of the blood, and the incompetent and absent valves of the jugular, subclavian, and facial veins That fractures and dislocations can be produced by muscular action during epileptic seizures is a well-known fact Why, then, during these seizures cannot the intrathoracic pressure be raised by muscular action to a corresponding degree as that produced by trauma The length of unconsciousness may have been augmented somewhat by the cerebral cyanosis A small portion of the blood no doubt was outside of the blood vessels, but from the diffuse bilateral character of the discoloration, and the manner in which it disappeared, I believe that which was extravascular to have been very small

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LIGATION OF THE EXTERNAL CAROTIDS

WITH REPORTS OF SEVEN LIGATIONS IN FOUR CASES *

BY ARTHUR LYMAN FISK M D

OF NEW YORK

WHEN severe and extensive operations are required either on the neck or face in order to control hemorrhage ligation of the carotid frequently has to be done. Which vessel the common or the external carotid is the vessel of choice does not appear to be definitely determined

This article is the result of my investigations to settle for myself this mooted point Richard Quain states that the common carotid artery sometimes gives origin at its upper part to the superior thyroid or ascending pharyngeal artery and in some rare cases to a laryngeal or an inferior or accessory thyroid These anomalies are rare generally the artery does not give off any branches The internal carotid does not give off any branch until it enters the skull Its distribution is almost entirely to the contents of the cranial cavity internal to the dura mater and to the structures in the cavity of the orbit The external carotid and its branches supply all the structures of the head and neck which are situated external to the dura mater except those within the cavity of the orbit It would seem therefore on anatomical grounds that ligation of the external carotid would control best all hemorrhage in those areas Why then is the common carotid ligated?

It is claimed that it is easier of access which should have little weight unless it possesses decided advantages that the other does not After ligation of the common carotid the blood is conveyed to the cerebral and ophthalmic branches of the internal carotid from the vertebral arteries and from the internal carotid of the opposite side by means of the very free

* Read before the New York Surgical Society March 10 1909

communication existing between these vessels in the circle of Willis, whereas, in ligation of the external carotid, its branches receive blood from the subclavian arteries through the anastomosis of the superior and inferior thyroids and the occipital with the deep cervical artery, and from the branches of the external carotid of the opposite side

“Blood, obeying the same law as all other fluid, will escape in the direction of least resistance. The large vessels at the base of the brain connecting the internal carotid both with its fellow of the opposite side and with the vertebrales would appear to offer less resistance to the blood current than is offered by the exceedingly fine anastomosis of the superficial vessels across the middle line. So fine are these anastomoses in the lingual arteries that Hyrtl doubts whether they anastomose at all” (Cripps)

There is a specimen in St Bartholomew's Museum in which a fine colored fluid injected into one of the linguals did not cross the middle line. In cancer of the tongue the lymphatics of the opposite side do not show invasion until that disease breaks through the median raphe, which from analogy would seem to bear out the idea of Hyrtl. Cripps cites an experiment upon a cadaver demonstrating the free communication existing in the circle of Willis. The right carotid artery was ligated, on the same side one or two branches of the external carotid were divided (the lingual and the facial) one inch from the trunk. Water was injected into the left common carotid, the water nearly all flowed out of the proximal end of the divided lingual and facial arteries on the right side. A ligature around the right internal carotid caused the flow almost to cease. The anastomosis between the two superior thyroids is next to the circle of Willis in free communication.

This Guthrie has well demonstrated. He opened the external carotid above the bifurcation of the common carotid, then he ligated the common carotid, bleeding persisted. He tied the external carotid above the incision into it, and still the bleeding continued. Then he tied the internal carotid, which cut off the circulation through the circle of Willis, but the

bleeding was not checked. He finally tied the external carotid below the wound but above the superior thyroid this checked the bleeding absolutely.

Failure to control hemorrhage after ligation of the common carotid would seem to be in consequence of not controlling the collateral circulation through these two free ways of communication excepting in those rare instances in which the anomalous branches of the common carotid exist. Careful inspection at the time of operation should avoid any oversight of such vessels.

From the foregoing facts and experiments ligation of the external carotid more thoroughly controls the collateral circulation and consequently hemorrhage than does ligation of the common carotid. A serious objection to ligation of common carotid is that it shuts off a large blood supply to the brain which may lead to the gravest consequences.

Cripps collected fifty cases from English and American literature of ligation of the common carotid of these twenty eight died which gives a mortality of 56 per cent. This agrees closely with the mortality presented by Pilz and Norris.

TABLE OF CAUSES OF DEATH IN TWENTY EIGHT CASES.

1 Brain symptoms	8 cases
2 Recurrent hemorrhage from the wound	8 cases
3 Secondary hemorrhage at seat of ligation	1 case
4 Dyspnoea	1 case
5 Exhaustion	5 cases
6 Cause not stated	5 cases

Eight of the deaths 28 per cent were directly consequent upon the operation. Eight deaths took place in consequence of the continued bleeding from the original wound after ligation of the common carotid.

In a mortality of 31 per cent in 314 ligations of the common carotid 26 per cent had cerebral symptoms (Zimmerman). Riese found brain symptoms in 17 out of 73 cases that is 23 per cent. Warren places the percentage as 20. Bryant says that the mortality of ligation of the common

carotid for the operation alone is 40 per cent, and Wyeth gives it as 44 per cent, so that ligation of the common carotid may, therefore, be considered as one of the most fatal operations in surgery

To reduce this high mortality, in 1895 Senger advised temporary ligation of the common carotid, and he demonstrated, experimentally, that the ligature may remain in place for from one to three hours without injury to the artery Schoenborn (*Deut med Woch*, 1896) devised artery compression forceps, consisting of two parallel steel bars, beak-shaped, and moving in the direction of their long axes, for temporary closing of the common carotid

George W Crile, in the *ANNALS OF SURGERY* of 1902 published his experimental and clinical research on the temporary closure of the common carotid artery His experiments consisted of nineteen operations upon dogs, and his clinical experience of eighteen operations on man In all there were twenty-eight closures of individual vessels The ages of the patients ranged from seven months to sixty-nine years Among the eighteen cases, there were three deaths Case VII, death from secondary hemorrhage on the thirteenth day, Case XV, death from pneumonia (in this case the external carotid was ligated) on the seventh day, Case XVIII, death from cerebral softening on the tenth day, a mortality of 11 per cent from the operation of ligation alone

The method of temporary compression of the common carotid, while it may diminish slightly the mortality, does not apparently eliminate the danger of secondary hemorrhage, and the more serious and greater danger, that of brain complications Other objections to this method are the cardiac and respiratory embarrassment which may follow the cutting off of the circulation to the brain, and also the injury to the coats of the artery from the clamps, which may be exceedingly serious should the wound become infected

Carl Schlatter, in the *Philadelphia Medical Journal* of April 13, 1901, writes that of 789 cases of ligation of the common carotid, 49 developed hemiplegia, one developed

imbecility and 18 developed delirium convulsions and other cerebral disorders Of those that lived a short time or recovered more than 7 per cent developed paralysis

Ligation of the external carotid gives on the other hand statistics which are much more satisfactory secondary hemorrhage seldom occurs there are no brain complications and the mortality is estimated as only one to four per cent as against forty to fifty six per cent in ligation of the common carotid The fear of secondary hemorrhage at the site of the ligature because of the close proximity of the large branches is not based on facts

M Guyon in the *Memoires de la Societe de Chirurgie* vol vi reported 27 cases of ligation of the external carotid to this number Cripps adds three making a total of thirty cases of which number there was only one single case of secondary hemorrhage Bryant collected nineteen cases of ligation of the external carotid with but one death Wyeth reported sixty seven cases of ligation of the external carotid with but two deaths these deaths were in cases of gunshot wounds during the Civil War and it is questionable whether death was due to ligation of the artery Dawbarn in his

Starvation Treatment of Certain Malignant Growths has collected forty-eight cases of excision of the external carotid in which eighty three operations were performed there were forty six recoveries and two deaths both of which were from shock He says that from an experience of more than fifty actual excisions of the external carotid the operation is surprisingly safe and there should hardly be any mortality at all following the excision surely not more than one per cent

W W Keen in the *ANNALS OF SURGERY* for July 1901 writes that while he does not wish to advocate indiscriminate ligation of the external carotid in cases of persistent hemorrhage from the tonsil or postnasal cavity in view of its effectiveness and the slight danger attending modern operations he urges that it be resorted to more frequently and not postponed too late

Bryant writes I am certain ligation of both external

carotids and their ascending pharyngeal branches, prior to the removal of large vascular growths involving the superior maxilla and the pharynx, or in retropharyngeal growths of a similar nature, should be earnestly commended."

John Lizars first ligated the external carotid as a preliminary step in excision of the superior maxilla, in 1830

Mr Cripps has compiled a table of eighteen cases, which shows that the external carotid or some of its branches are more frequently injured than either the internal or common carotid in wounds of the neck and head, as follows

External carotid	3
Lingual	1
Facial	1
Tonsillar branches	1
Parotid branches	1
Internal maxillary	2
Inferior dental	1
Middle meningeal	1
Ascending pharyngeal	1
Internal carotid	2
Common carotid	3
Vertebral	1

In eleven of these, possibly twelve, ligation of the external carotid was the vessel of choice to control the hemorrhage

Since 1905 I have ligated the external carotid seven times in four cases, reports of these are as follows

CASE I—*Cancerous disease of the right superior maxilla*
Ligation of the right external carotid, excision of the right superior maxilla, ligation of left external carotid five months later, enucleation of the right eye with excision of malignant disease within the orbit

A woman, aged 53 In 1893 she had hemorrhages from the right nostril May, 1904, there were several operations for some growth within the right naris which obstructed the breathing In August, 1904, the sight of the right eye was affected, and there was intense pain within the orbit February 21, 1905, she came under my observation The right eyeball was pushed upward, there was ptosis of the upper lid, there was a growth in the right

naris and bulging of the hard palate on the right side. She suffered intense pain.

February 25 the right external carotid was ligated under ether anaesthesia. The wounds healed *per primam*. There was almost instant relief from pain. March 7 under chloroform anaesthesia excision of the right superior maxilla was done in accordance with Ferguson's method. The hemorrhage was very slight, the recovery was rapid and excellent. The eyesight was almost completely restored and her physical condition rapidly improved. She was in excellent health for many months. On July 24 there was a slight recurrence of the growth in the roof of the cavity. The left external carotid was tied and this growth removed. On October 16 the growth had extended to the back of the orbit behind the eye. The eye was enucleated and the growth removed as thoroughly as possible. She died in the winter of 1905-06 from recurrence of the growth.

CASE II—Ligation of both external carotids simultaneously for cancerous disease of the right superior maxilla

Woman aged 67 with advanced Bright's disease. On September 9 1905 I saw the patient in consultation. She had malignant disease of the right superior maxilla invading the right naris, hard palate and floor of the orbit. There was ptosis of the right upper lid, intense pain in the eye, fetid discharge from the nose. Morphine was freely taken to control the pain. The woman had such an advanced Bright's disease with general arteriosclerosis that excision of the bone was thought unwise, but ligation of the carotid to retard the growth and check the pain was considered justifiable.

On November 17 both external carotids were ligated under chloroform anaesthesia. The wound healed by primary union and the patient had no bad symptoms. After the third day she was free from pain and did not require any morphine. The fetid discharge from the nose was greatly diminished. She was in the hospital for three weeks under observation, then returned to her home where she died within ten days from suppression of urine.

CASE III—Sarcoma of the right superior maxilla, ligation of both external carotids simultaneously, excision of the right superior maxilla, recovery

Man aged 64. January 9 1906 patient came under observation. He said that ten years before he had been kicked in the face

by a colt For months there was discharge from the right nostril There was marked ptosis of the right upper lid, intense pain on the eyeball, vision had been lost within two months Light only could be distinguished He was unable to wear his tooth plate because of pressure on the hard palate

On January 11, both external carotids were ligated Wounds healed by primary union, and the patient sat up on the second day On January 18, the right superior maxilla was excised, according to Ferguson's method The hemorrhage was very slight On January 19, the packing was entirely removed from the mouth, which was simply cleansed with H_2O_2 hourly thereafter On January 20, patient was up in a chair, skin incisions were painted with collodion They healed *per primam* On January 31, patient was discharged He died of local recurrence the last of the year

CASE IV — *Malignant epulis from the second molar on the left side, superior maxilla Ligation of the left external carotid, excision of the epulis, cocaine anæsthesia*

Man aged 70 In June, 1899, he had repeated attacks of hæmaturia July, 1899, suprapubic cystotomy was performed for supposed malignant disease of the bladder The hæmaturia ceased for a time, then began again and was intermittent thereafter during his life On March 2, 1908, he consulted me for a tumor of the right kidney, as large as a child's head There was marked cachexia, and there had been a loss in weight of two pounds per week Operation was not advised

On April 11, 1908, I ligated the left external carotid under cocaine anæsthesia and excised a large, rapidly growing, pulsating epulis, which filled the entire roof of the mouth The disease was found to have extended extensively throughout the superior maxilla The hemorrhage was very slight and easily controlled with iodoform gauze tampon The patient made an excellent recovery and was very comfortable for some weeks thereafter

His physician writes, "Mr H died June 4, of exhaustion The epulis returned, at the time of his death it was about one-third as large as when removed It never gave him as much trouble as it did before the operation, which always was a great comfort to him Autopsy showed that the right kidney was completely destroyed by the carcinomatous growth The liver contained metastatic nodules, the bladder was entirely healthy "

In the first case the external carotid was ligated ten days before the superior maxilla was excised although so long a period had intervened the hemorrhage at the time of operation was slight and readily controlled. The left external carotid was ligated some months later. There was never any disturbance following either ligation.

In Case II both external carotids were simultaneously ligated in a woman of sixty seven with advanced Bright's disease. Other than an additional pallor of the face there were no symptoms. The ligation afforded speedy relief from the intense pain she was suffering and made life bearable.

In Case III both the external carotids were ligated simultaneously without any symptoms. Seven days after excision of the right superior maxilla was performed the hemorrhage was very slight. The wounds healed by primary union and the patient was discharged in ten days.

In Case IV under cocaine anaesthesia the left external carotid was ligated and a large very vascular epulis excised in a patient greatly enfeebled by malignant disease of the kidney. The hemorrhage was slight and easily controlled by an iodoform gauze packing to the intense relief of the patient.

Ligation of the carotid arteries in these cases was not done with the intention of starving the growth but for the purpose of controlling the hemorrhage. In the first second and third cases starvation would have been impossible because of the involvement of the orbit by the growth and the supply of blood received through the internal carotids by the disease.

These cases forcibly impress the necessity of the early diagnosis of malignant disease in these areas in order that early operation may remove the disease thoroughly for in all these cases the recurrences were local without glandular invasion.

My conclusions from my experience in these cases and from my review of the literature are that ligation of the external carotid more thoroughly controls the hemorrhage than does ligation of the common carotid that there is less probability of secondary hemorrhage and that there is no fear of brain complications.

I consider that ligation of the external carotid is a safe and wise procedure in operations on the neck and face, especially in operations for the removal of malignant disease of the bones, and as a palliative measure for the relief of pain, where such disease cannot be removed

In ligating the external carotid the point of election is between the superior thyroid and lingual branches. The origin of the ascending pharyngeal must be determined and, if at the bifurcation of the common carotid, it must be ligated also

CYSTITIS AND ULCERATION OF THE BLADDER IN WOMEN

BY JOHN B SHOBER M D
OF PHILADELPHIA

Gyn ol g t t th H wa d d Gy ea Hosp tals d t th Ame Hosp tal f
Di es f th St mach S ge t th Ba H bo Hospital

THE fact that inflammation of the bladder occurs more often in women than in men has been generally admitted. This is readily understood when we consider the anatomical relations of the female urethra and bladder and the various traumata and pelvic hyperæmia and congestions both physiological and pathological to which women are subject. The short and nearly straight urethral canal renders the bladder accessible to infections from without and the frequent occurrence of pelvic inflammatory disease with extension to surrounding structures accounts for many cases of vesical disease.

The neuroses of the bladder the tumors which occur in it vesical calculi fistulæ and congenital defects will not be considered in this paper. All the other affections of the bladder which give rise to the symptoms of cystitis (a term by the way which is used to describe such a variety of conditions as to be misleading and confusing) are of an inflammatory nature and are the result of traumatism and infection.

It is well known that the intact mucous membrane of the bladder is non absorbent and has a peculiar power of resisting injury and the action of pathogenic organisms. Animal experiments along these lines are quite conclusive (*Centralblatt für Gynecol* 1886 443). In consequence cystitis due to the presence of micro organisms alone is unknown but the disease is always the result of traumatism followed by infection by micro organisms.

The micro-organisms which attack the bladder are the bacilli coli communis the gonococci the tubercle bacilli the streptococci the staphylococci and the typhoid bacilli. The

presence of these organisms in a normal bladder with intact mucous membrane is of no importance. They do not find a suitable soil for growth and are soon swept away with the urine.

Likewise a simple trauma, an injury to the mucous membrane such as occurs in child-birth, or by the pressure of a pessary or of a tumor, or by the end of a sterile catheter or other instrument, is of minor importance. Remove the cause and the injured mucous membrane will promptly recover its normal condition, provided the lesion has not been infected with pathogenic micro-organisms.

Overdistention of the bladder is a form of traumatism which often occurs. In addition to the resulting muscular paresis there must occur multiple lacerations of the mucous membrane. Under such circumstances the power to resist infection is impaired and micro-organisms find a suitable soil for development. This is favored by the decomposition of residual urine, which is present in these cases.

Perhaps the most common form of cystitis is that caused by infection by gonococci. Gonorrhœal cystitis is usually the result of a long-standing or a neglected gonorrhœal urethritis. We have very little accurate knowledge of its pathology. It is not known whether the infection causes a rapid general inflammation of the whole mucous membrane of the bladder, or whether the inflammatory process tends to remain localized, giving rise to areas of congestion, erosion, and ulceration. We do not know whether the infection extends along the lymph-channels or the blood-vessels. In almost all cases of cystitis, local as well as general, the trigone is the seat of hyperæmia and inflammation more or less intense, and in the majority of cases the process is localized to the region of the trigone, giving rise to the condition known as trigonitis.

Tubercular infection of the bladder may be either primary or secondary. Primary tubercular cystitis is said to occur, and many cases have been reported as such with rapid cure as a result of a few applications of silver nitrate through a cystoscope. There is no other part of the body where a tuber-

cular process can be cured by such simple treatment and therefore one is forced to the conclusion that the diagnosis of primary tubercular cystitis in many of the reported cases was a mistaken one or else that the relief obtained was only temporary and not permanent. It is difficult for an expert bacteriologist to distinguish the smegma bacillus from the tubercle bacillus and it is not impossible that many of the reported cases of primary tubercular cystitis were gonorrhœal or streptococcic ulcers of the bladder which yield very readily to treatment.

The only channel by which a *primary* tuberculosis of the bladder can occur is through the urethra. A catheter or other instrument introduced into the urethra might be the means of infecting the urethra or bladder with tuberculosis or a woman could be infected by a man suffering from a tubercular epididymitis or orchitis or by any other accidental manner in which the tubercle bacillus could be carried to the external urinary meatus. When we consider the improbability of such causes of infection and that the bladder except when injured has a peculiar power of resisting infection and that in no other part of the body can a tuberculous process be so easily cured it is difficult to believe in the reported cases of primary tubercular cystitis and still more difficult to believe that a secondary process can be cured so easily. Fenwick has said that surgeons do more harm than good by interfering with tuberculous bladders and that the favorable reports of cures are due probably to errors in diagnosis.

Tuberculosis of the bladder undoubtedly does occur but it is seldom primary and is usually secondary to a tuberculosis of the kidney the peritoneum the intestines or to a tubercular salpingitis. It usually causes a localized cystitis as a result of erosion or ulceration and is characterized by hæmaturia and extreme vesical irritability and pain. It is not amenable to treatment and the surgeon had best let it alone and attack the primary focus.

Streptococcic and staphylococcic infection of the bladder occurs frequently during the puerperium especially after long

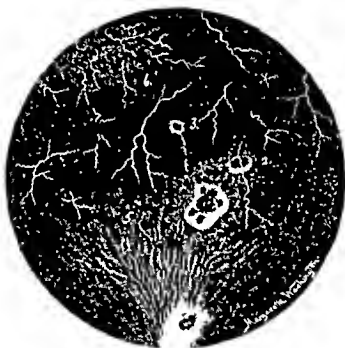
difficult, or instrumental labors, when the bladder walls may have been injured by long pressure by the child's head, or, as not infrequently happens, by overdilatation and stretching of the walls of the bladder, when it contains any considerable amount of urine during the third stage and latter part of the second stage of labor. The pressure thus exerted on the bladder walls may not be sufficient to cause a vesicovaginal fistula, and yet it may produce lesions of the mucous membrane, thus opening avenues for infection to any of the pyogenic organisms which may find access to them. A badly adjusted pessary may give rise to injuries of the bladder followed by the same results. It is possible that gonorrhœal and perhaps tubercular infection may occasionally occur in this way, but by far the most frequent infections occurring under these circumstances are the streptococcal and staphylococcal infections. An abrasion, a laceration, or an area of pressure necrosis thus infected with streptococci or staphylococci gives rise to a train of symptoms and appearances which are characteristic. At first there is frequent micturition, vesical irritability, and tenesmus. The urine is cloudy, occasionally streaked with blood, and contains pus, epithelium, shreds, and considerable mucus. At times there is fever with rapid pulse and evidence of a mild systemic infection. Proper medicinal, hygienic, and dietetic treatment, combined with carefully conducted bladder irrigations, will as a rule greatly relieve these symptoms and often effect a permanent cure. There are other cases, however, in which the symptoms are only partially or temporarily relieved. After the acute stage is over the patient continues to have mild symptoms of vesical trouble and enters upon the subacute stage, which is characterized by slight irritability of the bladder, with inability to hold the urine more than an hour or two during the day and three or four hours at night. The urine during this stage is fairly clear, containing some mucus, epithelium, and leucocytes and red blood corpuscles. If we make a cystoscopic examination at this time we find one or more areas of intense hyperæmia and congestion and occasionally a beginning ulcer with sharply defined edges and a smooth base. These

areas of congestion often look like scars and are deeply injected. The rest of the bladder is comparatively healthy except that the blood vessels especially in the neighborhood of the inflamed areas are markedly injected. The third stage of the disease is marked by the breaking down of these congested areas into ulceration. The edges of the ulcers become indurated but remain sharply defined and bleed easily and freely their bases become elevated by an interstitial inflammatory process and throughout these hypertrophies are deposited lime salts usually in the form of triple phosphates. These deposits on the bases of the ulcers are considerably elevated from the surface of the bladder and appear like dendritic growths. They are yellowish white in appearance and the edges of the ulcers are indurated bright red and bleed on the slightest touch. This stage may last for months or even years and the subjective symptoms are not necessarily severe. There is always some vesical irritability frequency of micturition and tenesmus but by far the most important and characteristic symptom of this stage is hæmaturia at times amounting to hemorrhage. The blood is always present in the urine and accompanied by more or less mucus and often by shreds and pieces which have broken off from the ulcers. These shreds are sometimes of considerable size a quarter or three-eighths of an inch in diameter and when sectioned show a fibrous tissue framework filled with deposit of triple phosphates and areas of small epithelial cells and leucocytes. Kolischer has described these ulcers and calls them traumatic granulomata. He reports four cases. They are undoubtedly identical with the simple solitary ulcer first observed by Skene. Fenwick observed them in men as well as in women but before the days of direct application and he was therefore unable to treat them topically. He also described the occurrence of contact ulcers and likened them to the stalactite and stalagmite formations in nature.

A typical case illustrating the above condition came under the writer's observation in February 1902. The modern elec

tric-light cystoscope made the diagnosis and treatment possible

The patient was a fairly well nourished woman aged 31. She had been married nine years and was the mother of four children, the oldest being seven years old and the youngest ten months. She had never had a miscarriage. She had just weaned her baby and had not menstruated since her last pregnancy. With the exception of a sister who died of rapid acute phthisis the family history was good. Her father died of malaria and her mother of some kidney trouble. She had three brothers and three sisters living and in good health. Her third child was born just one year previous to the last one. The labor was long and was terminated with forceps. A few weeks later she began to have frequent and painful micturition, at times every five minutes during the day and four to five times at night with ardor urinæ and tenesmus. At first there was no macroscopic blood. Later the acute symptoms subsided and she noticed that the urine was blood-stained and contained mucus and shreds and continued frequent. This condition continued during her last pregnancy. The urine was always deeply stained with blood and frequently contained small pieces and thick mucus and shreds. During the previous ten months she complained of left ovarian pain and backache. She was losing strength and weight and appeared anæmic. Pelvic examination showed lacerated perineum, normal cervix, uterus retroverted to third degree, appendages normal. A cystoscopic examination of the bladder under ether anæsthesia showed about one-half inch above the left ureter a well-defined ulcer (1) about the size of a dime, its base filled with an elevated, cheesy, necrotic deposit and the edges sharply defined, also elevated and deeply injected. Surrounding the ulcer was a hyperæmic area with injected vessels about the size of a silver quarter dollar. About one-quarter inch northeast from this ulcer was a similar ulcer (2) about the size of a pea. Just about the centre of the base of the bladder and an inch above and a little to the right of the large ulcer was another (3) about one-half the size of a pea, and a fourth ulcer (4) somewhat larger than a pea was finally discovered at the apex of the trigone just within the internal urinary meatus. The whole trigone was the seat of an intense hyperæmia which rendered it difficult to locate the ureters. Just above the trigone and running off to the right from the



3 4 ulcers 5 pot f begn ung ul er t 6 7 cysti f ilicl

large ulcer were several small spots (5) deeply injected apparently seats of beginning ulceration. In the northwest portion of the field in the fundus of the bladder there was an area of congestion with injected vessels studded with small cystic follicles (6) giving a granular appearance and strongly suggesting miliary tubercles. Surrounding the lower edge of the large ulcer was a similar condition (7). With the exception of the areas noted the mucous membrane of the bladder presented a normal appearance.

The edges of the ulcers bled freely upon the slightest touch. The illustrations (Figs 1 and 2) beautifully picture the condition as first observed and the result of ten topical treatments covering a period of thirty six days. The ulcers were numbered in the order in which they were discovered.

All topical treatments were given under cocaine urethral anæsthesia with the patient in Trendelenburg position. The bladder was previously irrigated with boracic acid solution and catheterized. After the cystoscope was introduced it immediately became distended with air. Any remaining fluid was sucked out with a bulb. Each ulcer was gently dried with a pledget of cotton on a wood applicator then it was gently mopped with a weak adrenalin solution to check bleeding. Any loose shreds were removed from the ulcers with the bladder forceps after which each ulcer was touched with a pledget of cotton soaked in a 1:8 solution of nitrate of silver. The patient was then lowered the bladder emptied of air and three ounces of a 2 per cent solution of protargol was instilled. The patient could usually retain this for a half hour. These treatments were made about every second or third day. She received a daily irrigation of boracic acid solution followed by the instillation of 2 per cent solution of protargol. Absolute rest in bed was insisted on with a restricted diet and she drank freely of lithiated water. Treatments were begun on March 3. After the second treatment it was noted on March 8 that ulcer No 3 had healed. No 2 was healed on the 14th after the fourth treatment. On March 24 it was noted that No 1 was one third its original size and looked less angry its edges bled less easily and the trigone was less congested. Macroscopic blood also mucus and shreds were still present in the urine. On April 3 No 3 was healed and the urine was clear and free from mucus and shreds and no macroscopic blood was

detected Analysis showed sp gr 1010, acid, trace albumin, epithelium, urates, and uric acid, also red blood-corpuscles and leucocytes, no casts

Ulcer No 4 was very stubborn and yielded slowly, but by April 16 it had healed At this time the bladder presented the appearance shown in Fig 2, and the urine was entirely normal The patient has since borne two children and has remained free from bladder symptoms The case illustrates the chronic stage of ulcer of the bladder and a successful method of treatment

TUBERCULOSIS OF THE BLADDER *

BY GRANVILLE MacGOWAN M D

OF LOS ANGELES CAL

Professor of Genito-urinary Surgery in the University of California

THE three cases which I report in this article illustrate what I believe to be a very unusual condition of obstruction of the outlet of the urinary bladder by growths which mushroom like spring up on a tuberculous focus within the bladder or the prostatic urethra and simulate true bladder tumors and illustrate very well the extremely virulent tuberculous process that gives rise to such growths. While the thorough removal of these granulomata is rendered obligatory when they interfere with or prevent the act of urination great care should be exerted to leave no unnecessary raw surfaces for every such space is vulnerable and will be attacked by the bacilli. Healing of the wounds will be slow in any case and perhaps never take place in some. I have not seen this condition described in the literature which is accessible to me and yet it probably has been observed by other surgeons working much with the bladder.

CASE I—Fanny M. 17 years old had suffered from dysuria and great frequency since puberty and for a year there had been blood in her urine. It was surmised by those having charge of her that she had vesical calculus though the result of sounding was negative. The high cut was made but no stone was found. The bladder was not inspected further and the wound was left to heal as it might. January 12 1905 after eight months a large fistula persisting she was brought to me for treatment. Much of the urine leaked away continuously but more was passed in small quantities with great frequency and much tenesmus.

We examined her bladder with a cystoscope found it tuberculous then opened it through the scar of the former operation and on inspecting the inner surface through a speculum a large

* Read before the Medical Society of the Territory of Arizona April 27 1908

polypoid mass and several smaller ones were seen to spring from irregular ulcers, with raised edges, upon the right side of the bladder base. The longest of these tumors reached to the bladder neck and swung into the infundibulum of the urethra, where, obstructing the exit of urine and easily bruised by action of the detrusor, it caused the frequency and gave origin to the hemorrhages.

These growths were removed by curettage, the bladder closed, the abdominal wound packed, and the bladder drained with a catheter tied into the urethra, this she pulled out before the edges of the abdominal wound had fully united, causing a leakage. The bladder was irrigated daily with solutions of sublimate 1:100,000. Permanent closure was not effected until April 7, 1905. In the scrapings we found tubercle bacilli. She now urinated hourly, but without pain, the urine was full of pus and *débris*, and contained 0.083 per cent of albumin after being centrifuged. She grew very anæmic, and her feet became dropsical, this condition improved under cardiac tonics and peptomanganate of iron. The ulcers were treated by direct application of silver nitrate, through a Bransford-Lewis cystoscope, with much benefit.

An enlarged right ureter could be felt through the vagina at her first examination, but the kidney could not be palpated. About October 2, 1905, she had a severe pain in her right loin, a chill, high temperature, then began a rapid enlargement of this kidney with aggravated sepsis, requiring the removal of both kidney and ureter to save life, which was done by me January 3, 1906. This wound was very slow in healing, but after repeated exposures to the X-ray, finally closed in August, 1906. The treatments of the bladder were resumed as soon as possible. In June, 1907, she was urinating at very reasonable intervals, without pain, she was fat and strong, and got married. We have not heard of her since.

CASE II—Ira P., 45 years old, farmer. For 25 years, the history shows, he had been asthmatic, and for 10 years had dysuria. The urethra was abnormally sensitive. The urine was ammoniacal and there was a residuum of 70 cc. Cytoscopic picture, that of interstitial cystitis, a thick trabeculated bladder wall, ulcerated in places, dark purple in others, with dilated ureters, the left being double. No stone. A tumor the nature of which

could not be made out could be seen on the left side November 27 1905 suprapubic cystotomy and removal of the tumor which proved to be a soft granuloma springing from a tuberculous ulcer surrounding the left ureter This was long enough to obstruct the urethra and cause the residual urine with its accompanying cystitis

All the ulcers were elevated flat and covered as was also the polyp with a diphtheritic like coating which contained tubercle bacilli The tumor was removed with scissors its base being cauterized the ulcers curetted and the bladder drained through the wound which was closed about a De Pezzer drain After the fourth day the bladder was irrigated twice daily with solutions of sublimate 1 100 000 His condition improved greatly and his asthma disappeared entirely On account of the extreme sensitiveness of the urethra and the hysterical nervousness of the patient no local application could be made through the endoscope and for a long time it was impossible even to introduce a catheter to facilitate irrigation Infection of the whole surface of the wound by the tuberculous process occurred immediately and after fighting it until June 23 1906 with repeated curettages with cauterization with chloride of zinc carbolic acid and silver nitrate and with exposure to the X ray we did not succeed in getting it entirely healed I then lost sight of him.

CASE III—January 11 1907 H E S 32 years old soldier has had tuberculosis of the lungs but is now apparently cured For the past five years he has had attacks of dysuria accompanied by pyuria and at times very severe painless hemorrhages from the bladder From time to time tubercle bacilli have been found in the urine Urinary frequency about once in three hours bladder capacity 150 c c Urine acid and contains pus albumin and a large number of mononucleated round cells

For nearly a year he has had to strain in passing urine at first slightly but recently the abdominal and chest muscles have been called upon to assist in urination By cystoscopic examination we found many large diverticula in the bladder wall and there were abundant small tuberculous ulcers most numerous high upon the right side and a large mass was seen plainly projecting from the bottom of the trigone about the left ureteral opening Some of the ulcers gave evidence of recent hemorrhage others were healed leaving scars

January 9, 1907, I opened the bladder by the high cut. On the right upper quadrant, posteriorly, there was a large elevated granuloma, on the left upper quadrant, anteriorly, there was a second, and a third, much larger than the others, surrounded the left ureter. On dilating the bladder neck a similar growth was found springing from the lower floor of the prostatic urethra—this latter acted like a cork, and was the immediate cause of the strain in urinating and of the residual urine. There were numerous shallow tuberculous ulcers of the usual type over the whole bladder. The latter were curetted and their bases touched with pure phenol. The elevated surfaces of the soft growths were covered with a grayish, diphtheritic-like pellicle. All of the tumors were removed with rongeurs and their bases curetted and cauterized with phenol. Examination of the *débris* of these granulomata showed abundant tubercle bacilli. In order to get at the intra-urethral growth I had to button-hole the perineum. The hemorrhage was rather severe, so the bladder was drained both supra- and infrapubically. As in the preceding cases, malignant tuberculous infection took place promptly, and in a very characteristic manner.

April 29, 1907, the wounds having shown no capacity to heal, it was thought best to curette out the jelly-like granulations. When this was done the cavity of the bladder was found contracted to the size of a green almond, its walls, rendered bare of epithelium in many places by the extensive curettage and cauterization, had adhered in all directions, and there were many fibroid nodules in them which looked and felt as if they were scars that had undergone keloid changes. These adhesions were broken up and the cavity enlarged to about the size of an unhulled walnut. Daily exposure of these freshened wounds were made to the hyperæmic influence of a 500-candle power electric lamp, for about two weeks, without benefit. Exposure to the concentrated sun's rays, passed through a lens for five minutes each day, was then tried with marked benefit, until the weather became unsettled and this treatment had to be discontinued. Afterwards for nearly two months the abdominal wound received short exposures to the X-ray, every second day, but without any marked therapeutic effect. He was then put upon tuberculin, the T. R. being used in minute doses, controlled by opsonic observations taken every five days for two months, and afterwards for six months empirically.

At the same time he was sent to the seashore at Santa Monica where he spent an hour or more each day with naked abdomen and thighs exposed to the direct rays of the sun remaining in the open air in a wheel chair the balance of the day. The improvement in his general health was very great his weight advanced from 130 to 170 pounds the condition of his wounds improved but closure did not take place. In January of this year as the limit of improvement under tuberculin appeared to be reached in searching for the organisms of the mixed infection Dr Leonard found the colon bacillus *Staphylococcus aureus* and the *Bacillus pyocyaneus*. The latter disappeared with the use of the copper salts. An autogenous vaccine was prepared of the former and its use commenced. Sinuses in the abdomen and perineum were curetted again and cauterized with a 50 per cent solution of zinc chloride two weeks afterwards both had closed but both have reopened at the time of making this report.

Treatment of Tuberculosis of the Urinary Tract—The disease is not rare. During the twenty two years of my practice in Los Angeles I have seen much of it and I am not by any means pessimistic in regard to the results of treatment in such cases. Many get well. In 1903 I analyzed the history and treatment of forty two cases of tuberculosis of the bladder and kidneys which were carefully examined and held under my care for a considerable time and I have seen a much greater number since. The majority of these people were in comfortable circumstances and but one was wretchedly poor.

It is remarkable how long in some the existence of urinary frequency and hematuria had been noticed in one ten years in two fifteen years and in one fifty years. Distinct hereditary tendencies were present in only 7 per cent of these cases. In fifteen there was marked contracture of the bladder. Twenty five were cystoscoped and in twenty four of these tuberculous ulcers or miliary tubercles were found.

The cardinal indications for treatment of any case of tuberculosis of the urinary organs are (1) estimation of the damage already done (2) relief of pain and hemorrhage (3) lessening of urinary frequency (4) prevention of further progress of the disease.

In no case should dependence be placed upon local treatment only. Use must be made of such general remedies as the personal experiences of many observers have testified to be of value. These may be classified as follows.

Constitutional remedies, such as tuberculin, gaduol, guaiacol, creosote, iodine in the form of euophen, iodoform, and iodine vasogen, mercury, arsenic, iron, and the bitter tonics.

Urinary Antiseptics—Hexamethylenetetramine, the oils of eucalyptus, santal, and wintergreen, salol, aspirin, and salicylate of soda, borocitrate of magnesia, and boric acid.

Analgesics—General, as antipyrine, phenacetin, codeine, heroine, and morphine, those acting by being excreted through the kidneys, as methylene blue and methyl salicylate, those whose action is both local and general, used ordinarily in the form of suppositories, as nirvanin, antipyrine, heroine, iodoform, ichthyol, and extract of opium with belladonna.

A diet as liberal as the circumstances of the individual will allow, outdoor exercise in the sunshine if possible, freedom from sexual excitement, the use of flannel abdominal bandages, and the wearing of fine woollen or knit undergarments like those made by Phister or Deimel, are essentials in the treatment.

The happy effects of iodine are often as noticeable in securing the cure of localized tubercular lesions as they are in syphilis, and I think this drug the best for the constitutional treatment of tuberculosis.

Practical trial has given me faith in the use of euophen byunction as recommended by Lawrence Flick (*Medical News*, Sept 2, 1899). Ten per cent iodine vasogen used in a similar manner possesses distinct value.

Four to eight cubic centimetres of guaiacol mixed with olive oil in the proportion of 1 : 7 rubbed into the abdomen over the bladder once a day, has seemed to me to be beneficial, but its odor practically bars the individual treated from association with his fellows. Guaiacol preparations known as duotal, fagusol, and benzozol, in 0.3 doses three times a day, act as tonics and urinary antiseptics. Theoretically, cod

liver oil should be of value in the treatment of tuberculosis of the bladder. I sometimes use it scented with rose or violet by massage after the bath. I abandoned its use by the stomach many years ago in the treatment of consumption and substituted its active principle gadol which I give in the form of Merck's Elixir. It is a most useful general tonic in urogenital tuberculosis.

I am sure that the cautious use of mercury by the mouth or in the form of the unguentum hydrargyri colloidalis by inunction or by intramuscular injections of salicylate of mercury is sometimes of assistance in obtaining a cure of urogenital tuberculosis.

Urinary antiseptics are of value in combating the bacteriuria which is invariably present and may also help to allay the infective inflammation. The choice of which to use should be governed by circumstances. Care should be taken to so regulate their doses that they do not act as irritants.

Analgesics become necessary to alleviate the pain and cystospasm. I always avoid the use of morphine so long as it is possible. Codeine in full doses repeated as necessary will usually be sufficient. Of the coal tar preparations compounds of acetanilid phenacetin and phenalgin are the best. Phenocoll in capsules of 0.3 once a day is even more useful. The crystallized alkaloid hyoscyamine is also of value.

I do not know how methylene blue acts but it certainly has a calmative influence upon the cystospasm present in many cases of tuberculosis of the trigone. It is not necessary to give large doses. Such quantities as are usually prescribed are sure to disturb digestion and are apt eventually to irritate the urinary organs. I find that 0.015 three times a day between meals is all that is necessary to insure full therapeutic effects and that this dose may be continued for many months.

The use of suppositories vaginal in the female rectal in the male to allay pain is frequently necessary. A formula which I have found very useful for this purpose is codeine sulphate 0.3 heroin 0.1 antipyrine 6 cocoa butter 14. This may be used every eight hours. Nirvanin 0.3 anti

pyrine, 3, and cocoa butter, 14, is another useful formula. When these do not suffice, either opium or morphine must be resorted to.

Where direct application can be made through a cystoscope, the mitigated silver nitrate stick fused on a silver probe and bored into the ulcers after previous cocainization, as is done in lupus nodules, is curative at times.

Instillations of small quantities of solutions of sublimate into the bladder, after the method of Guyon, has given me excellent results. These seem better than those reported by Guyon and Casper, but this I attribute to my making these instillations daily and habitually using the solutions much weaker than others recommend them, rarely having the strength greater than 1/7000, for sublimate in very weak solutions, 1/100,000, has noticeable irritative properties when used for irrigations by the Janet method, and I have seen very violent reactions follow instillations of 1-3 c.c. of 1/15,000 solutions of this salt.

No solution should ever be used in a tuberculous bladder so strong as to cause a painful reaction, or so plentiful as to distend the organ to its full capacity.

It is very easy within the first two weeks to tell whether these instillations will be of benefit. They usually lessen and sometimes cause entire cessation of the pain, and diminish the frequency of urination very promptly. It certainly seems remarkable that a few drops of a mild solution of sublimate let trickle slowly into an empty bladder should so profoundly affect a pathological process which is often chiefly situated beneath the mucous membrane. Its action is contrary to what might be expected from laboratory experiments, but the results are so uniform that it must be more than fancy upon the part of those of us who have observed them.

Nearly all of these cases are ones of mixed infection. Without the pus cocci there is not so much vesical irritability, and it may be that sublimate acts by inhibiting the growth of these organisms, thus lessening the irritating influences of the infective cystitis. Or there is a possibility that this diluted

mercurial directly inhibits the rapid growth of the tubercle bacilli in the immediate neighborhood of its application

The treatment of tubercular cystitis is so different from that of pus infection of traumatic or gonorrhoeal origin that great care must be exercised wherever tuberculosis is suspected or where the cystic symptoms do not yield or become worse under ordinary treatment. A thorough search of the other organs of the body repeated microscopic examinations of the urine for tubercle bacilli and frequently cystoscopy with possibly ureteral catheterization may be necessary to establish a differential diagnosis

Care should always be taken to avoid a traumatism or added infection in these local examinations for by the open door of such a traumatism the tubercle bacillus may enter from the blood and find a work shop

It is to be remembered that a pyelitis often causes excessive cystospasm frequency and bloody and purulent urine and such a pyelitis is not necessarily of tuberculous origin. Where a mixed infection is evidently present and the services of a competent pathologist can be obtained it is best to have the predominating organisms isolated by culture and an autogenous vaccine prepared and used together with minute doses of tuberculin

I have seen many striking illustrations of the harmfulness caused by the use of tuberculin in too great and too frequent injections yet I cannot praise too highly its value as an assistant in effecting a cure when used intelligently. An opsonic control is desirable until one gets the patient's gait so to speak. But the chief factor is to commence with a dose that does not cause a perceptible clinical reaction in the diseased tissues and while the dose may be gradually increased it should never be great enough to cause chill increase of temperature or depression. We find that of the T.R. 0.0003 milligramme is sufficient as a commencing dose and we never give a greater dose than 0.001 milligramme. The intervals of administration are usually four to five days

A bladder the walls of which have become infected by

tuberculosis always has its capacity reduced, but they are not all small bladders, and very many of them are not thick walled. Casper warns against unnecessary cystoscopy of such bladders. I should not advise a novice in cystoscopy to practice the art upon a tuberculous bladder merely for the sake of acquiring experience. By the use of 30 to 60 cc of a 5 per cent solution of nirvanin, or a 2 per cent solution of cocaine in a 10 per cent solution of antipyrine, or a 5 per cent solution of novocain, as a local anæsthetic, the injection of 0.06 of tropococaine into the spinal canal, or in chloroform or ether narcosis, one who is familiar with the use of the instrument may conduct such an operation and gain much valuable information without detriment to the sick person, if the bladder will hold 90 cc without spasmodic contraction, if there is no involvement of the posterior urethra, and if scrupulous cleanliness and gentleness are observed. Indeed, such examinations may act by suggestion and thus become a curative agent, as two of my cases would seem to indicate, or the prolonged exposure to the electric light rays may do good, for I frequently observe marked alleviation of pain and frequency follow such cystoscopic examinations in my practice.

From my experience I must also differ from many who deprecate surgical interference in vesical tuberculosis. When the distress is great and the cystoscope shows tubercular ulcerations in a bladder that will hold 100 cc or more under anæsthesia, after a reasonable trial of constitutional treatment, urinary antiseptics, and instillations of sublimate without benefit, I do not hesitate to interfere surgically.

If the type of the disturbance is the elevated granuloma described in the cases reported in detail in this paper, no further interference than that required for the gentle removal of the lesions is advisable, but, aside from this class of cases, the interference must surgically be thorough and complete in order to succeed. I attribute much of the benefit of curettage of tuberculous lesions to the destruction of the foci by the inflammatory changes set up. Tubercles, wherever found, must be dealt with mercilessly or let alone. I have had no

experience in the curettage of bladders through the urethra for my practice is greater with males and my female patients have with one exception either been cured or so greatly alleviated that surgical interference was not necessary

Suprapubic section should be done The bladder should be dried and then explored by aid of electric light The most satisfactory instrument for this is the Bransford-Lewis female cystoscope with which one can view all portions of the bladder easily the concave face of the instrument acts as an excellent retractor for the bladder wall If the ulcers are few in number and favorably situated they may be fished up with tenaculi assisted by the pressure of the hand of an assistant within the rectum curetted excised and the edges of the wound brought together with fine catgut If as is usually the case the ulcers are numerous and small or the lesions be chiefly miliarv or the tubercles few but disseminated in a sodden and gelatinous mucous membrane very rough curettage of the entire mucous surface should be practised with very sharp curettes The dermal curettes of Prince Morrow and the Volkmann curettes made by Colin of Paris are useful for this work In most instances it is best to thoroughly dilate the vesical neck and the prostatic urethra with uterine or Kollman's curved urethral dilators so as to avoid subsequent tenesmus The primary hemorrhage is readily stilled by hot normal salt solution The bases of all such ulcers after curetting should be touched with a 50 per cent solution of zinc chloride or pure lactic acid used on fine swabs or by fine Paquelin or electric points through a caisson

During the first twenty four hours the bladder should be irrigated every hour with hot normal salt solution or continuously by the drop method and adrenalin chloride given as a stimulant and styptic if necessary Subsequent treatment should consist of suprapubic drainage by means of the De Pezzer tubes and a washing of the bladder once or twice daily with a warm solution of sublimate 1 100 000 introduced through the urethra by a catheter This treatment should be continued until the urine becomes clear which will be in from

two to six weeks. Medicinal and hygienic measures the value of which has been shown as adjuncts should not be omitted during this time.

Where the tuberculous process has invaded the whole bladder structure, and where there is a thick, contracted, brittle bladder, that will not hold more than 20 to 50 c c under deep anæsthesia, surgical interference may be tried as a last resource, but it will probably not prove beneficial. If the tuberculosis is descending from the kidney and only one kidney is involved the removal of the organ is necessary to quiet the cystitis, and the ulcerations will then usually heal.

It is interesting to know how tubercular infection of the bladder takes place and what the lesions look like. It is impossible ever to say certainly that a tuberculosis of the bladder is primary, but as tuberculosis occurs in isolated colonies in bone, muscle, skin, and other parts, so just as certainly it occurs alone, at times, in the bladder. In all cases that have been reported by me as primary, there were no symptoms pointing to the invasion of other organs.

A great deal of ingenuity has been spent in the endeavor to determine whether the process is ascending or descending, whether the invasion is by the peritoneal route through the intestine, or primary by the vesical blood supply. I believe that in most instances these tubercular lesions arise by the deposit of the bacilli by the blood current on or in traumatic centres.

It is sometimes exceedingly difficult, and occasionally impossible, in cases of tubercular lesions to ascertain their chronological order. "The disease begins by formation of gray miliary nodules, colonies of tubercle bacilli, which produce chronic inflammation, with certain retrograde tissue metamorphoses, which are characteristic." These give rise usually to multiple ulcers which tend to coalesce and sometimes reach considerable size, as large as half a dollar or even a dollar. They may be punched out with undermined edges, or raised above the level of the bladder wall and covered with a coating,

grayish or buck skin colored of fibrinous exudate which contains tubercle bacilli

They evince when in clumps a tendency to form circles and the single ulcers are often circular or ovoid but whatever their shape they have a whitish yellow margin surrounded by a narrow vascular zone Radiating from the caseating tubercles one often sees small blood vessels like a spider's web giving a telangiectatic appearance to the mucous membrane surrounding them and the subsequent ulcers and frequently minute hemorrhages appear in the centre of these lupoid nodules

Outside of the line of ulceration milary tubercles are sometimes seen shining clear through the pinkish yellow vesical mucous membrane In one case I observed a ring of them extending around an ulcer giving it the appearance of a ruby set within a circle of small pearls

The mucous membrane about a milary formation is abnormally vascular and in that portion of the fundus which might be described as the anterior part of the trigone and within and upon the mucous membrane lying about the bladder neck posteriorly and immediately adjacent thereto there is often a reddish moss like condition to be seen cystoscopically Then again we sometimes see the image of a cloudy swelling or a gelatinous appearance which is analagous to that found in some cases of lupus where preceding ulceration the skin is swollen and purple and the capillaries enlarged and the nodules difficult to detect In one of my cases of tuberculosis of the renal cortex before pus appeared in the urine there was atrocious pain upon standing or walking referred to the bladder base and increased urinary frequency with painful priapism The cystoscope showed moss like capillaries irregularly distributed about the vesical neck and in the trigone the ureteral pillar of the distressed side being swollen and the membrane over it had the appearance of having had powdered paprika sprinkled over it most minute hemorrhage without ulceration This was probably the ptomainic irritation referred to by some authors It was followed later by milary tubercles and ulcers

In what proportion of cases can the tubercle bacillus be detected? In tuberculosis of the bladder, tubercle bacilli are not always present and their detection is often very difficult. In my experience they were found in less than 50 per cent of the cases. They could not be detected sometimes where the character of the disease was perfectly evident, the mucous and submucous coats of the bladder riddled with tubercles, or a tuberculous kidney or seminal vesicle discharging a continuous stream of pus and caseous *débris* into the bladder. Again they were found where the lesions were very slight and the character of the disease could hardly be suspected. Their detection in the urine may give rise to error, for it does not locate the anatomical seat of the lesion.

I believe that urinary tuberculosis may remain stationary for a long time, that is in a latent condition, and that spontaneous cure sometimes takes place by encapsulation. Calcareous changes in tubercular nodules in the vesical walls have never been observed by me, but this process is possible, and it is not improbable that it is sometimes the origin of stones found embedded in the bladder wall.

For diagnosis, we depend usually upon the cardinal symptoms of frequent and painful urination, with the presence of blood, pus, and tubercle bacilli in the urine, and a lessened bladder capacity. Yet all of these symptoms without the tubercle bacillus would not give a positive assurance of tuberculosis of the urinary tract, nor does the absence of tubercle bacilli give any assurance that the case is not one of urinary tuberculosis. But we have at our hand the ocular inspection of the urethra by the electric endoscope and of the bladder by the cystoscope. I depend, where there is any doubt, upon this cystoscopic examination, and though it is not always satisfactory, it will commonly give positive proof of the presence or absence of vesical tuberculosis, and usually also, to one expert in the reading of the condition of the ureteral mouths, a like assurance with relation to the condition of the kidneys and ureters.

A remarkable thing is that one so rarely sees in vesical

tuberculosis the common concomitants of tuberculosis of other internal organs. There is not ordinarily any evening rise of temperature, marked emaciation, night sweats, or loss of strength, unless at the same time there is pus confined in the kidneys, prostate, or the seminal vesicles.

How many we be sure of a cure in any given case? The cures are always open to suspicion as to their permanency. They are rather to be esteemed as apparent cures. I have chosen this word purposely to indicate that the individual who has once been the subject of tuberculosis is always there after a suspect, though I firmly believe that the local recurrence of tuberculosis after an apparent cure, after a long period in which all symptoms have disappeared and no ocular or other signs of its presence may be noticed, is not to be looked upon as a lack of cure in the first instance, but rather as a fresh growth in soil peculiarly adapted for its propagation. You may destroy all the roots and seeds of a weed, but you do not destroy the soil in which some other seed of the same kind of plant at some future time may be deposited, and the soil being favorable to their growth, a development of the plant is not to be looked upon as arising out of lack of destruction of the former weed, but rather as a fresh crop derived from another source. So it is with tuberculosis recurring as it is called in any part of the human body after a long interval of absence of detectable disease.

THE SURGICAL TREATMENT OF TUBERCULOSIS OF THE EPIDIDYMIS AND TESTICLE.

BY CHARLES GREENE CUMSTON, M D,
OF BOSTON, MASS

DURING the past few years the treatment of tuberculosis of the seminal gland and its adnexa has given rise to much discussion. In 1899, the Surgical Society of Paris considered the question of surgical treatment very fully, while in 1907 an important paper on epididymectomy was read and discussed before the New England Urological Society. In going over the reports of these meetings there is one point upon which accord seems unanimous, namely, that castration should never be resorted to until all other treatment has proved useless. Bilateral castration, as is well known, sometimes gives rise to very serious mental disturbances. These are not due simply to the mental effect on the patient from his knowledge that he has lost both seminal glands, but the loss of the genital functions and sexual impotence are factors of far greater importance. Then again the internal secretion of the glands must occupy a very prominent place, for it is well known that the testicle possesses a function quite independent of the spermatogenic secretion, a function controlling, to a certain extent, the organic equilibrium.

The exact nature of this function is as yet rather obscure, but nevertheless it seems undeniable. It is commonly admitted that every glandular structure having an external secretion, when deprived of its excretory ducts, becomes atrophied, while the testicle, on the contrary, when deprived of its excretory duct, retains its normal structure and size and shows no evidence of an atrophic process. A loss of virility has been noted following diseases which suppress the functions of the testicle, such as the orchitis of mumps or syphilis. Contrary to gonorrhœa, tuberculosis is particularly prone to attack the epididymis and never gives rise to impotence.

Another and perhaps more important fact is that patients who have been deprived of the excretory ducts of both testicles have for all that retained their genital faculties. They are sterile but retain their virility whether the solution of continuity of the excretory ducts is pathological as occurs in tuberculosis and gonorrhœa or of a traumatic or operative type as occurs for example in bilateral epididymectomy. It is rather difficult to establish a demarcation between the disturbances produced in the organism from the removal of the testicles and those simply arising from the moral effect produced by their loss but in practice this is really of no particular import. But there is one point upon which I would insist namely that if one testicle or even a small portion of one gland is left the internal secretory functions will continue. It is for this reason that many surgeons have advised early castration in cases of unilateral infection and several years ago I was inclined to coincide in this view as will be seen by my paper published in the *American Journal of Medical Science* June 1904. Although I still believe much of what I said therein I nevertheless must confess that since I have adopted epididymectomy the results obtained have been so encouraging that I feel this is the proper surgical procedure *when the seminal gland itself is not involved in the process a fact which can only be ascertained by first splitting open the testicle*. If then the latter is found free from disease it is sutured and the epididymectomy proceeded with. I must lay particular stress upon this exploratory incision of the testicle which I referred to at the New England Urological Society a few months ago when demonstrating some specimens of tubercular epididymitides removed surgically.

Berger has said that the question of castration in tuberculosis of the testicle may arise when only one gland is involved usually in the early part of the process when the lesion in this organ can be proven to be the only tubercular manifestation in the patient and he is of the opinion that under these circumstances castration represents a radical measure by which an isolated focus of tuberculosis may be removed that in other

words, it is curative. Consequently the partisans of early castration resort to this operation even when the epididymis is only apparently involved, believing that the testicle is also often invaded even when it appears intact, but, as I have pointed out, *if exploratory incision of the organ is made*, the question is at once settled. The partisans of castration hope by radically doing away with the tuberculous focus they will prevent extension of the disease to other viscera, and particularly the remaining testicle. In defense of their attitude they say that in cases where lesions of the prostate and seminal vesicles exist, the later undergo regression after castration, while their last argument is that it is useless to preserve a testicle which has lost its power of spermatogenesis, this function as well as that of the internal secretion being amply fulfilled by the remaining testicle, which it is hoped will remain healthy. In my paper on castration for tuberculosis already referred to, I quoted a number of surgeons who had never seen the remaining testicle become involved after an early castration of its diseased fellow, while others say that should the second one become involved a conservative treatment can always be resorted to.

Let us now examine the arguments put forward by those believing in conservative measures. In the first place they state that an early unilateral castration is justified if it could surely arrest the progress of the tuberculous lesions and if it could positively assure immunity to the remaining organ. But this is far from being the case, and no matter how extensive and complete be the effect of the operation, one can never be sure that all the tuberculous lesions have been done away with, for they are frequently secondary to lesions of the same nature in the lymph-nodes or viscera and are unrecognized at the time of the operation. It is more than probable, I believe, that many patients have lesions of the same nature in other organs, and to my way of thinking, if this is the case, this very fact takes away all curative and prophylactic value of castration.

It is known that, generally speaking, it is by way of the

prostate and seminal vesicles that tuberculosis of the genital glands makes its invasion and no matter how fine the results obtained by Berger and others by early unilateral castration it is to be supposed that they have had to deal with a particularly fortunate series of cases because numerous are the instances in which early castration has not prevented the development of the disease in the opposite testicle. It should also be pointed out that the warmest partisans of early radical interference advise a conservative treatment if the remaining testicle becomes in its turn involved and it may be questioned why one should wait for this to occur to put in practice this treatment with a greater chance of success since only one testicle remains. This method is not only a dangerous one but it is likewise useless for the simple reason that the best results obtained by it are no better than those derived from less radical measures. I believe I can safely say that recurrence after epididymectomy is no more frequent than when castration is done while its influence on the patient's general condition is quite as good and its action on a diseased prostate or seminal vesicle quite as marked.

Operations on the epididymis alone have the same action on the regression of prostatic and vesicular lesions as has castration as has been said and no lesser authority than Delbet has said that he has never seen an abscess of the prostate or seminal vesicle occur after the conservative operation had been done. The rapidity of some postoperative improvements has even led him to question whether or not the symptoms considered as characteristic of tuberculosis of the prostate and seminal vesicles were not in some cases simply due to congestion of these organs. But in those cases where the tuberculous lesions of the prostate and vesicles were undeniable he is led to suppose that the virulent products of the tubercles in the epididymis constantly spread over the upper spermatic tract and that doing away with these bacterial discharges by removal of the epididymis resulted in their cure.

However this may be such improvement certainly does occur after epididymectomy and for this reason cannot justify

castration. This first point appears to be settled, but there is another upon which opinions seem to be in accord and yet the conclusions are absolutely in opposition, I refer to acute tuberculosis of the testicle. In this form, which at the commencement is usually distinctly localized, early castration is advised in order to prevent rapid extension and the dangers of generalization which are present, all the more so because the testicle usually becomes eliminated by purulent disorganization when surgical interference is not resorted to. Now if, generally speaking, castration is to be condemned in cases where the lesions of chronic tuberculosis are beginning, if on the other hand radical operation is a necessary evil in acute tuberculosis and in certain hopeless cases, there are cases of medium intensity in which the testicle itself is markedly involved and for which many surgeons advise castration. I shall refer to this question later on.

Tuberculosis of the epididymis, with or without involvement of the seminal gland, is a distinct type of local tuberculosis, and if in a number of cases it occurs in subjects who are otherwise tuberculous, there are also numerous instances where the patient is attacked in a state of perfect general health and may probably never present any other tuberculous lesion, at least none that is clinically appreciable. The researches carried out by Reclus, which are both pathological and clinical, have led to the following conclusions. In 50 per cent of the cases the lungs were not involved clinically. The results of the autopsies were somewhat different, because in only 33 per cent the lungs were not involved, and the same conclusions are to be found in Villard's statistics, which show that the testicle alone was involved in 30 per cent of patients autopsied. From this it will be seen that the dictum that tuberculosis of the testicle will sooner or later extend to the other organs is not by any means absolute. In point of fact, in many cases genital tuberculosis develops and runs through its clinical course without involving any other organ, while it frequently presents a tendency to spontaneous cure, this being the result of the defensive reaction of the tissues. From this it may be

concluded that surgical treatment has its indications and will very frequently give very excellent results

A man 35 years old in otherwise apparent good health developed tuberculosis of the left epididymis about seven years ago. Castration was done early in the process by a Boston surgeon. Five years afterward he developed the process in the right epididymis. There was no apparent lesion of the prostate or vesicles by rectal examination or symptomatically. I saw the patient in consultation about six weeks after the commencement of the process in the right epididymis and operated a few days later. Exploratory incision of the testicle showed that it was normal. Epididymectomy was done the organ being filled with pus and about the size of the little finger. It is now two years since this was done the patient is in excellent condition and has his testicle.

Much discussion has been given to the question as to how the bacillus reaches the testicle and leaving aside those cases in children where the infection is directly transmitted from the peritoneum to the vaginalis by way of a patent vaginoperitoneal canal and on the other hand rejecting the theory of ascending infection by way of the urethra it may be admitted that in the adult tuberculous infection of the testicle is either transmitted by a descending epithelial infection or by way of the blood. It seems to be an acknowledged fact that the testicle may be invaded by the extension of tuberculous lesions in the kidney or bladder in which case the bacillus follows the course of the urine and then descends that of the sperm. In tuberculous cystitis it is still an open question whether or not latent prostatic lesions are the first to appear but in the majority of cases it is by way of the blood that the infection occurs whether it attains directly the testicle itself or as is more generally admitted it in the first place invades the prostate and the testicle secondarily by the vas deferens. Thus is explained why the epididymis is always involved before the testicle and the importance of this pathologic notion from the therapeutic standpoint is easily conceived because an early interference will reveal lesions localized to the epididy-

mis only, and its removal may be resorted to without touching the testicle

The tuberculous lesions arising in the testicle of the adult commence always in the epididymis, and Reclus's statistics are conclusive in this respect, because in numerous cases he only once found the lesions limited to the testicle. Now, if the epididymis is the first involved, it nevertheless must not be forgotten that the infection does not remain localized to this structure, and very often the testicle is involved at the same time, as will be seen by the following figures given by Reclus, out of sixty-eight autopsies both the epididymis and testicle were involved in forty-eight subjects, the epididymis alone in twenty. Thus in about two-thirds the testicle and epididymis were simultaneously involved.

If now we consider the clinical aspect, the proportion will be found reversed, because in only about 33 per cent of patients did the testicle appear involved. This is easily explained from the fact that in the epididymis the tuberculous infection presents itself from the very commencement in the form of caseous masses which are easily palpated, while in the testicle only granulations arise which do not change the anatomical condition of the organ when palpated. If caseous masses do exist they are usually found in the body of Highmore, adherent to the epididymis, from which it is impossible to differentiate them. From the practical standpoint the impossibility of making this distinction is of no value.

From the clinical point of view the disease may appear in two very different aspects. In the first, which corresponds to the period of development of the tubercles, a swelling formed by one or several hard foci is felt, while more or less pain is elicited by pressure. In other cases the entire epididymis is involved and may reach two or three times its normal size, while the seminal gland itself is normal to the feel and not enlarged.

The functional disturbances, usually absent, are those symptoms arising in the bladder and prostate, these being frequent desire to urinate, a mild degree of vesical tenesmus, slight

hæmaturia a seropurulent urethral secretion etc These symptoms would seem to indicate an early participation of the prostate in the infection and in point of fact if rectal examination is made at this time one will usually encounter tuberculous nodules in the prostate and seminal vesicles But during all this time the tissues subjacent to the testicle present no changes the skin is normal in color movable over the testicle and only a slight hydrocele occasionally indicates a reaction in the vaginalis

On the contrary when the lesions are to end in suppuration pain will be complained of and characteristic local symptoms will be observed At some point in the scrotum usually on its posterior aspect that is to say where it is in direct relationship to the epididymis the envelopes of the testicle will be found to have lost their normal mobility on account of the adhesions with the gland the skin becomes reddened and a point of fluctuation will be found this finally opening and giving exit to caseous material A fistula then results giving exit to a certain amount of secretion for an indefinite period sometimes momentarily closing up only to open later In some fortunate cases it will end by closing for good leaving behind a cicatrix adhering or not to the testicle by a fibrous cord But one thing to be particularly remembered is that *very frequently in spite of several fistulae and the persistency of suppuration the lesions may nevertheless remain localized to the epididymis* A number of such cases including one of my own prove this where after more than a year of suppuration the epididymis was found alone involved and the testicle itself healthy

The patient thirty three years of age was referred to me for two fistulae on the right side of the scrotum The testicle on this side had been enlarged for four months then an abscess formed which opened after which the fistulae remained Several months later another abscess formed this being incised by his physician The fistulae continued to secrete a certain amount of tuberculous matter When the patient came under observation the right side of the scrotum was red and posteriorly two fistu

lous openings were found. By palpation the right testicle was with difficulty made out from the epididymis, the latter was very much enlarged and painful on pressure. The vas deferens was slightly enlarged and hard to the feel. The prostate did not appear enlarged, its surface was regular, and no pain could be elicited on pressure. In other respects the patient's health was perfect, and several days later epididymectomy was done with free removal of the vas, and at the operation the testicle itself was proven to be absolutely normal by an exploratory incision. The patient made an excellent recovery and was perfectly free from any trouble nine months after the operation.

In tuberculosis of the epididymis one can be extremely radical in all operative interference, because the organ simply represents a single tube rolled up on itself, and as far as excretion of the sperm is concerned, it has lost this function from the fact that its lumen has become permanently obliterated by the tuberculous process. Therefore, the removal of the entire organ will in no way change the condition of affairs from what it was before the interference. This statement applies equally well to bilateral epididymectomy. This means that, although I now reject early castration for the reasons already given, I do not believe that it is necessary to hold to merely a general treatment as some writers advise, when the lesions have not gone on to suppuration. In many instances this treatment will cause a regression of the lesions, but one should not lose sight of the numerous cases where the process has a tendency to extend when an insignificant operation might have been quite sufficient completely to control the situation.

Many methods for destroying the epididymis have been advocated in the past, but to my way of thinking clean and decent surgery in case of the epididymis as with salpingitis resides in complete enucleation. And in point of fact a tuberculous epididymis is in reality a miniature pus-tube. Therefore, I will limit my remarks here to the technic of epididymectomy as I perform it. The incision should be made on the anterior aspect of the scrotum to the extent of two or three inches, and should include all the structures of the

scrotum comprising the vaginalis so that the testicle is at once freely exposed. Next the testicle itself is split open and thoroughly examined and if found healthy it is sutured with fine catgut *not* chromicized and the removal of the epididymis is then proceeded with. The separation of the epididymis should be begun at its tail and all that is necessary is to incise the vaginalis both inwardly and outwardly in order to decorticate the organ from the testicle. A little further up the fold is cut which unites the middle portion of this organ to the posterior superior border of the testicle. The vas deferens is cut but care must be taken in doing this not to injure the internal branch of the spermatic artery which reaches the testicle at this point. Consequently one should nick the vaginalis at the internal aspect of the head of the epididymis and then the vas deferens having been cut the epididymis is drawn upwards and simply peeled off from the vascular mass. When this is done the epididymis is simply retained by a few small vessels the vas deferens and cellular tissue and a ligature having been applied to this mass a stroke of the scissors completely frees the organ. Any bleeding should be controlled and after this a small cigarette drain in contact with the testicle is inserted and the scrotal incision closed. The drain may be removed at the end of two days.

This technic is proper when the epididymis alone is involved and even in certain cases where the lesions involve only a portion of the epididymis partial resection of the organ may be resorted to but I do not advise this believing for the reasons given above that total epididymectomy is the only proper procedure. Certain surgeons have endeavored to form an anastomosis between the vas deferens and the testicle after epididymectomy and those desirous of more ample detail on this subject I would refer to my paper on *Castration for Tuberculosis of the Testicle* to which I have already referred.

Now if the body of Highmore looks suspicious after the epididymis has been removed it should also be excised. If the vas deferens shows evidence of disease it is absolutely necessary to resect it as far up as possible and as it may be fol

lowed down into the peritoneal cavity for a considerable distance by means of an operation that I devised a number of years ago for the radical cure of malignant disease of the testicle, and as this technic seems to me the best that has been so far offered, I would refer those desirous of knowing the steps of this interference to Casper's "Text Book" (American Edition), Binnie's "Manual of Surgery," in which it is described, or to my original paper, which appeared in *American Medicine*, April 18, 1903

In those cases where the epididymis is adherent to the posterior aspect of the scrotum, or if an abscess has opened in this region, the organ should be reached at this point instead of by an anterior incision. If necessary, the diseased skin and structures may be resected, the fistulæ likewise excised freely, in order to avoid dissemination of the infection during epididymectomy.

The conservative operation of epididymectomy for tuberculosis has given so far a really large number of both successful and permanent results, but I would now consider the circumstances which would force one to resort to the more radical operation of castration. In the first place an indication for castration would be a failure to cure the process by epididymectomy. Curettage and cauterization in cases of recurrence may be resorted to, but if these fail to control the process, if fistulæ persist, the testicle must be sacrificed in order to do away with the prolonged suppuration. It is useless to endeavor to preserve the seminal gland in these cases, and the earlier the radical interference is undertaken the better it will be for the patient's general health. I also believe that castration is absolutely indicated in patients who present advanced pulmonary lesions, because the local lesions in the genital apparatus will have no tendency to disappear after a conservative operation and these subjects cannot stand the debilitating effects of a prolonged suppurating process. However, I would point out that if the patient is well to do and can live in Colorado or other resort an unexpected cure may sometimes be obtained without operation, but recovery from a genital

tuberculous infection can never be surely counted on from climatic treatment and therefore in most instances operation is advisable

I would like to say here a few words relative to the acute type of tuberculosis of the epididymis and testicle. Its characteristic is *the intensity of the symptoms presented at the commencement of the process*. In a very few days the testicle becomes the seat of extreme pain while at the same time a tumefaction appears. Palpation shows that this tumefaction has a perfectly smooth surface and involves the epididymis particularly; the testicle can be made out separately at least at the commencement. This however is not absolutely true of all cases because both organs may be equally involved forming a single mass and careful palpation will not enable one to distinguish between the epididymis and the seminal gland. The tumefaction may become very considerable while a certain amount of hydrocele, redness and œdema of the scrotum indicate the participation of the vaginalis and skin in the process. There is a local elevation of the temperature likewise elevation of the general temperature.

But what is to be particularly noted is that in the acute form the prostate and seminal vesicles remain uninvolved in the beginning of the process. After a few days of the acute symptoms a period of remission occurs. The general symptoms disappear and the affection can then in no way be differentiated from the ordinary type other than by the rapidity with which the tuberculous lesions made their appearance and progress. Within a few days or a few weeks suppuration will invariably occur the pus burrowing outwards and giving rise to interminable fistule which give exit to the disintegrated testicular tissues. The general condition of the patient is quickly affected by the suppuration and at about this time prostatic and vesicular lesions denote that the infection which was in the first place localized has extended beyond its primary limits.

In the treatment of these acute cases a conservative operation is absolutely out of the question and castration is fully

indicated at the earliest possible moment I have referred to my technic of castration, which is a very radical one, and in closing this paper I will quote from my article already mentioned on "Castration for Tuberculosis of the Testicle"

"Von Bungner has pointed out a fact which is well known, that the spermatic cord is often diseased without presenting much evident infection at the time of operation. From this arises the danger that the diseased parts which are left behind in the cord will act as disseminating foci for further tuberculous infection, and, in order to avoid this danger, he recommended a new method which he termed castration with evulsion of the spermatic cord. As in castration, the spermatic cord is separated from the vessels and its surrounding coverings, the vessels are tied off below the external inguinal ring, and then the isolated vas deferens is slowly but steadily pulled upon until it breaks. The piece of vas is removed along with the diseased testicle and epididymis. In his operations, von Bungner was able to extract about four-fifths of the spermatic cord by his method of evulsion, and, according to his statistics, he obtained a cure in 50 per cent of his cases.

"It is quite evident that removal of the vas deferens should be undertaken as far as possible in every case of castration, especially when it is evidently diseased, but the method of evulsion is certainly not devoid of danger. Lauenstein and Helferich pointed out the danger of the occurrence of hemorrhage in the pelvic tissue from the traction exercised on the vessels accompanying the spermatic cord. The first-mentioned authority performed castration with evulsion of the vas in thirteen cases and in several succeeded in removing quite large portions of the cord with much benefit to the patient, but in two instances such severe hemorrhage arose that it was extremely difficult to control it. Since this time Lauenstein only removes as much of the vas deferens as can be pulled down without exercising traction upon it.

"A point which should not be forgotten is that in the method of evulsion the peritoneum can easily be torn, and with the raw surface of the cord the peritoneal cavity might

easily become infected. Consequently the method of evulsion is certainly not devoid of danger and it also should be remembered that in all probability the diseased spermatic cord will rupture at a point where it is infected by the tuberculous process on account of lesser resistance. If this be true and there is every apparent reason that it should be so it would naturally scatter tuberculous material which would be the starting point for a new dissemination of the disease. For these reasons Schede employs a technic similar to that described by Lauenstein dissecting the spermatic cord up as high as possible and then ligating it at a point where it appears to be healthy and for this purpose it may be necessary to dissect the peritoneum off the cord to a certain extent. It is evident that in this operation as in others the spermatic cord is not always removed beyond the point of disease and consequently the affection still remains in the intra abdominal portion of the vas which is left behind. For this reason it becomes evident that the removal of the vas in its intra abdominal portion must be accomplished under the direction of the eye and this can be done if my technic for the radical cure of malignant disease of the testicle be correctly employed.

REMOVAL OF A GAUZE SPONGE FROM THE SCROTUM, TWO AND A HALF YEARS AFTER AN OPERATION FOR DOUBLE INGUINAL HERNIA

INCLUDING A REPORT OF FIVE CASES IN WHICH FOREIGN BODIES WERE LEFT IN OPERATIVE WOUNDS OTHER THAN IN THE PERITONEAL CAVITY^{*}

BY HERMAN L KRETSCHMER, M D,

OF CHICAGO,

Assistant in Surgery, Rush Medical College

THE extreme ease with which foreign bodies, especially sponges, gauze pads, artery forceps, etc., are left in an operative wound is proven by the large number of cases that have been reported in the literature. In recent years the subject of foreign bodies left in the abdominal cavity after operation has been very carefully studied by Neugebauer of Warsaw, who has collected a total of 236 cases from the literature, as well as by Schachner of Louisville.

Foreign bodies left in extraperitoneal wounds have not been so carefully studied, probably on account of the less serious nature of the lesion. In this paper it is the object to discuss only the extraperitoneal cases.

Such an occurrence is a very undesirable one, and especially from a medicolegal point of view, because as a rule the foreign body is not found by the operator, as this class of patients do not always seek relief from their condition by calling on the surgeon who performed the operation, but they usually consult a second physician for the relief of their symptoms. The latter is the one upon whom so much depends, as he may be the direct cause of either preventing or starting medicolegal proceedings.

If we consider the number of operations that are performed for the relief of inguinal hernia, the case to be cited below is

^{*} From the Surgical Clinic of Dr Arthur Dean Bevan, Chicago

to be looked upon as extremely interesting for the following reasons (1) on account of the long period of time (two and a half years) during which the sponge remained in such a relatively superficial part of the body without producing any symptoms (2) on account of the rare occurrence of this condition (3) the ease with which the sponge was removed this being accomplished without the patient's knowledge

CASE—J W aged 36 entered the Central Free Dispensary June 10 1907 giving the following history Two and one half years ago he was operated upon for a double inguinal hernia The patient states that he was in the hospital for three weeks and that there was no suppuration in the wound Patient has been working ever since he left the hospital Two weeks before his admission to the dispensary he noticed some pain in his scrotum on the right side which was soon followed by a discharge of pus

In the upper half of his scrotum in the right side of the raphe were to be seen two swellings the larger of which were about the size of the tip of the little finger These swellings were red smooth and glossy so that the normal scrotal folds were lost Fluctuation elicited in both swellings Between these two swellings and about an inch below them was seen a small opening which had been discharging Upon closer examination a shred was seen protruding from this opening By grasping this shred with a pair of tissue forceps a long mass of gauze was removed from the scrotum After unfolding this mass of gauze it was seen to consist of a long piece measuring 17.5 centimetres and of a short piece measuring 6.5 centimetres A third small fragment was also found (Fig 1)

The two above mentioned swellings were opened and a small amount of pus discharged from each The sinus from which the gauze was removed was in direct communication with the two superficial abscesses above mentioned Fortunately the gauze was removed without the patient's knowledge and he was not informed of its having been found in his scrotum

At the time of its removal the entire amount of gauze was removed in one mass like a small roll and it was only after unfolding the mass that it was found to consist of three distinct pieces of gauze

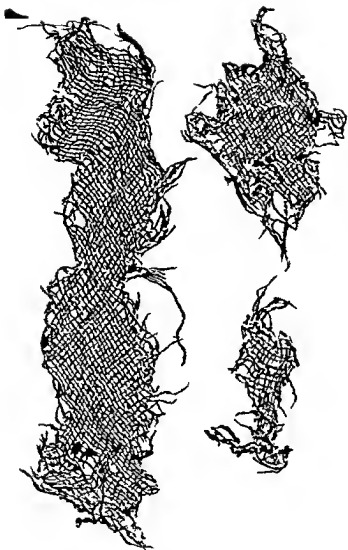
Inasmuch as the texture of all three pieces of gauze is alike it is but reasonable to suppose that the two smaller pieces are a part of the larger pieces, which have become separated, either by the infection which was present, or by the macerating action of the tissue fluids, aided perhaps by leucocytic action

Gauze sponges left in the abdomen have been removed as long as two and a half to three years after the original laparotomy, on the other hand, they have produced symptoms as early as 24 to 48 hours after operation. It is therefore rather interesting to note that a sponge can remain in such a superficial area for so long a period of time without producing any subjective symptoms

In seeking an explanation for the occurrence of this complication Neugebauer calls attention to the following conditions, one or more of which may have been present in the individual case: poor anæsthesia, absence of good light, unfavorable position of the patient, operating without the regular assistants, deep-seated operations, and the occurrence of profuse bleeding

The rare occurrence of this condition in connection with operations for inguinal hernia may be due to the relatively superficial position of the field of operation, as well as to the absence of profuse bleeding during the course of the operation

As an explanation for the presence of the sponge in this case we may consider the following possibilities: (1) During the course of the operation, it may for various reasons have been packed into the scrotum and then have been entirely overlooked. (2) The sponge may have been inserted into the wound for purposes of drainage and subsequently it may have slipped into the wound where its removal was overlooked. (3) It may have been used to control a slight oozing, and may not have been seen in position at the time of closure. After lying in the inguinal canal for some time it wandered down into the scrotum and there produced the local symptoms which resulted in its removal



G u z m d f r o m s e r t m d h l f y a r a f h e r t m y

It is a well known fact that foreign bodies left in the body may wander which fact is proven by those cases in which sponges artery clamps etc have wandered into the lumen of the bowel to be expelled *per rectum* or by those cases in which the foreign body was removed from the lumen of the bowel by an operation which was called for by the presence of symptoms of intestinal obstruction

The class of cases in which the foreign body was left in an operative wound other than the peritoneal cavity have not received as much attention perhaps as they should and on this account I would like to add the following five unpublished cases

Dr Arthur Dean Bevan has very kindly given me the data in the following three cases

CASE I—A woman with a large goitre which had existed for a good many years Within a year marked exophthalmic symptoms developed and it was decided to remove the goitre under cocaine anæsthesia as the heart was in very bad shape The operation was an extremely trying one on account of the large size of the goitre the very considerable hemorrhage and the nervous condition of the patient During the operation some gauze was packed deeply in the neck to control some venous hemorrhage The wound was closed with the exception of a small cigarette drain in the centre of the Kocher incision which had been employed The woman made a very good recovery and her exophthalmic symptoms disappeared very rapidly A small fistula persisted At the end of six weeks Dr Bevan wrote her physician to enlarge the opening and curette the fistulous tract In doing this he found a gauze sponge which he removed and then the fistula closed within a short time

CASE II—A very similar case to the first was brought to Dr Bevan's office About 18 months before a physician had operated upon a young woman of 30 and removed one of the lobes of the thyroid in a case of exophthalmic goitre The wound had never healed completely and a fistula persisted and recently developed a reddened swollen area about one and a half inches in length and one inch in width At the upper and lower extremities of this swelling there were fistulæ out of which

was coming a dirty, brownish-yellow pus, and the fistulæ were surrounded by flabby granulations. Dr. Bevan suggested to the attending physician a possibility that there might be a foreign body, either such as a silk ligature or chromic acid catgut, or a piece of gauze, as the cause of the trouble. Within a day or two the patient brought to this physician's office a piece of gauze several inches long, which she had pulled out from one of the fistulous tracts. These are the only two cases that Dr. Bevan has ever heard of in which gauze was left in at the time of goitre operations.

CASE III—A man came to the Clinic suffering from a papilloma of the bladder. This was carefully examined with a cystoscope and a suprapubic operation decided upon. This was done as an ordinary suprapubic cystotomy, the papilloma being removed from within the bladder. A rubber drainage tube was left in the bladder and gauze strips packed in the prevesical space. The patient made a good recovery. A fistula persisted, however, from which there came at intervals some pus. About six weeks after the operation, on dressing the wound, the fistula was enlarged slightly with a pair of forceps and a gauze strip found, eight or ten inches in length. After the removal of the gauze the fistula healed completely.

CASE IV—Dr. Louis E. Schmidt has kindly given me the data of the following case, which was admitted to his service at the Alexian Brothers' Hospital, several years ago. The patient had been operated upon several years before his admission, for an external urethrotomy. Inability to find the proximal end of the urethra necessitated the performance of a suprapubic cystotomy with retrograde catheterization. Further details during the patient's stay in the hospital are not known.

Upon his admission to the hospital the patient complained of painful and frequent urination. Cystoscopy shows the presence of long incrustations of lime salts swinging to and fro in the bladder fluid, leading to a diagnosis of incrustated silk sutures in the bladder wall. Operation, suprapubic cystotomy revealed the presence of a gauze sponge in the suprapubic space, a few shreds of which were lying in the bladder wall and hanging free in the bladder cavity. After the removal of the sponge the patient made a prompt recovery.

CASE V—For the data of the following case I am indebted

to Dr F W Rohr A patient who was suffering from an osteomyelitis of the femur was operated upon the bone was curetted and drained The patient gradually improved and left the hospital with the wound still open At a later period the patient again complained of pain in the old wound for the relief of which he entered another hospital where an ordinary metal probe was removed from the wound

These cases demonstrate that just as much care should be used in keeping an accurate count of small sponges in both intra and extra peritoneal wounds as is used in keeping track of the large gauze pads used in the abdominal cavity

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BONE TRANSFERENCE

REPORT OF A CASE OF OPERATION AFTER THE METHOD OF HUNTINGTON *

BY ERNEST A CODMAN, M D,

OF BOSTON, MASS

Assistant Visiting Surgeon, Massachusetts General Hospital

DURING the last five years the treatment of osteomyelitis of the long bones has been greatly modified by the adoption of the operation of subperiosteal resection¹ The principle on which this operation is based is founded on the observation that the shaft of a bone may be entirely resected subperiosteally and yet be again reproduced by the periosteum in so complete a manner as to fulfil the normal function of the bone

In cases of long-standing osteomyelitis where the bone is irregularly diseased, Nichols has shown that much time may be saved the patient by a radical removal of all the diseased part of the shaft, trusting to periosteal regeneration In other words, the time consumed in the healing of a case of osteomyelitis treated by old-fashioned methods is sometimes far longer than if the shaft of the bone is resected entire and a new healthy bone allowed to regenerate Practically, there is an important drawback to this argument, for in certain cases the periosteum fails entirely to form new bone This leaves the patient in a condition even worse than before the operation In the ANNALS OF SURGERY, 1905, vol 41, p 249, Thomas W Huntington of San Francisco reported a case of this kind and suggested a most ingenious expedient to overcome the difficulty Dr Huntington's suggestion was that the shaft of the fibula should be transferred to take the place of the shaft of the tibia He demonstrated that if this were

* This case was shown on Feb 3, 1907, at a meeting of the Suffolk District Medical Society, Boston, Mass

¹Dr E H Nichols, of Boston, has published the best paper on this subject See Journal of the American Medical Association, February 3, 1904

done and good union were obtained between the ends of the transplanted shaft and the remaining portions at the ends of the tibia the fibula would hypertrophy to such an extent as to become virtually as strong as the former tibia

The case which I have to report is in most of its details similar to the one reported by Huntington As far as I know no other cases have been reported except one by Dr James S Stone of Boston *ANNALS OF SURGERY* 1907 vol 46 p 648 Both Dr Stone's case and my case differ slightly in technic from the one reported by Huntington but the suggestion of Huntington is the essential part of the operation

The following is a brief report of my case

CASE—L H P aged 32 factory hand In 1883 after a blow on the shin just above the ankle an abscess appeared which was lanced Thus discharged continuously for fourteen years Pieces of bone occasionally came out In 1897 he was operated on at the Maine General Hospital The discharge ceased for seven years In July 1904 he had another blow on the leg which was followed by an abscess which had not healed On December 3 1904 he entered the Massachusetts General Hospital At this time the right tibia was much thickened bowed and nodular The skin was adherent to the shaft of the tibia and a long ulcer with base of necrotic bone existed On December 7 1904 the shaft of the tibia was resected by Dr J C Warren and the periosteum approximated On March 10 1905 the patient was discharged from the hospital wearing a splint The bone had not regenerated On May 6 he returned because of pain and because a sinus had opened up On May 8 1905 he was again operated on by Dr J D Barney and an attempt made to dissect out the sinus On May 23 he was again discharged with the wound granulating On July 11 1905 he returned to the hospital on account of the persistent sinus The X ray showed no regeneration of the middle of the shaft On July 13 1905 he was again operated on by Dr C L Scudder who dissected out the sinus removed a small fragment of the lower end of the tibia and did a plastic operation on the skin On August 28 1905 he was discharged with a clean granulating wound

On October 2 1905 he returned again to the hospital much

discouraged and desiring amputation. The old wound had not healed, the ulceration was indolent and necrotic, and there was no sign of regeneration of the shaft of the tibia. Owing to the looseness of the upper tibiofibular articulation the leg was wobbly and useless. The long disuse had caused a considerable amount of stiffening of the ankle and subluxation at the knee joint. In other respects the patient was a healthy young man and a good subject for operation. Except for the chance of trying Huntington's suggestion, amputation seemed to be the only outlook. I am indebted to Dr F B Harrington for the opportunity to operate on the patient.

Operation, October 26, 1905. A curved incision five inches in length was made across the leg about four inches below the patella down to the lower edge of the upper fragment of the tibia. The tip of this fragment was chiselled clean and the fibula cut across a little above the same level. By bending the leg outward the upper end of the lower fragment of the fibula was forced into the place prepared for it in the upper fragment of the tibia. It was then forced a little way into the spongy bone and the whole leg brought into a straight line. The dead space left at the point whence the fibula was transferred was filled with a portion of the tibialis anticus muscle.

To heal the ulceration of the scar tissue at the seat of the earlier operations I adopted the following plan, which I have found useful in other cases where the cause of the delayed healing seemed to be adhesion of the scar tissue to the bone. The scar tissue was freely dissected away and a thick flap taken from the adjacent healthy part of the leg and sutured over the bone without tension. The raw surface left where the flap was removed was then immediately covered with skin grafts from the thigh. (Skin grafts applied over bone do not heal well and easily break down, whereas a thick skin flap containing all the tissue down to the fascia gives permanent healthy repair.)

The whole leg was then put up in plaster. On November 30, 1905, five weeks after the operation, the patient left the hospital with the wounds all healed and fair union between the tibia and transplanted fibula.

The fibula seemed such a slender support that for some months I insisted on his using a plaster-of-Paris cast to strengthen it. By using crutches and bearing an increasing amount of weight on the tiny fibula it was encouraged to hypertrophy. As may

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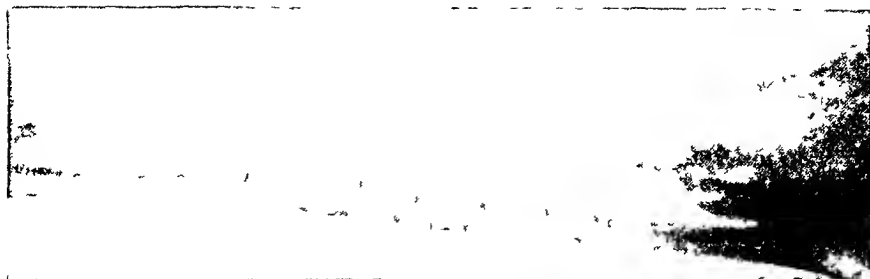


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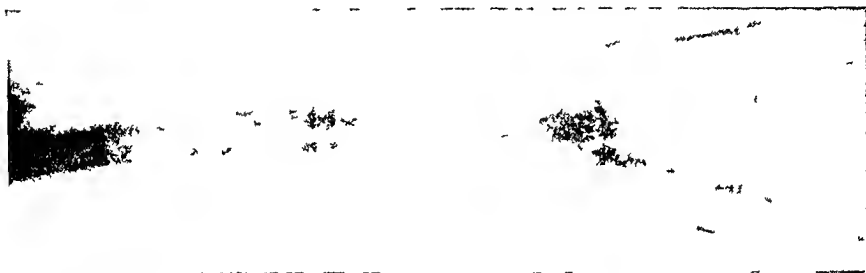
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FIG 4



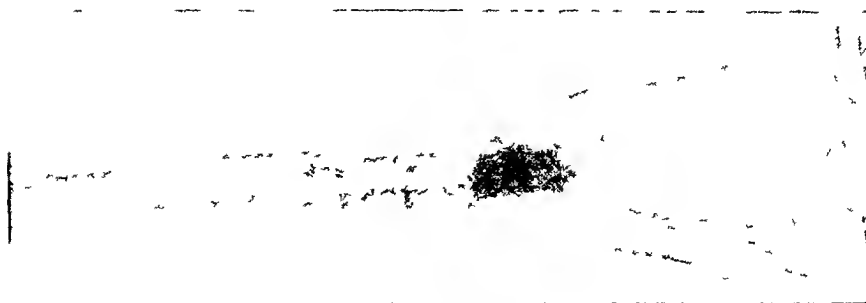
Before transference of fibula

FIG 5



One year after transference of fibula

FIG 6



Three years after transference of fibula

be seen by the X ray at the end of a year there was no great increase but at the end of three years the strength of the bone is more than doubled and is approaching that of a normal tibia

The functional value of the leg without support was nevertheless practically normal in less than a year. It is now normal except for a slight limp caused by the shortening (one inch) and some stiffness of the ankle. It seems perfectly strong although the patient is wisely somewhat careful of subjecting it to severe strains.

I have hesitated to report this case before for fear that possibly the good condition of the leg might not prove permanent but as it is now over three years since the operation and as the strength of the leg has continued to gain I feel no hesitation in recommending this operation for those unfortunate cases in which subperiosteal resection has been a failure. I have another case in which I have done the same operation of bone transference but which is not yet fully united. It seems to me that it is important to report these cases whether they are successful or not because in the next decade subperiosteal resection is likely to be a common operation and is likely to fail in a considerable percentage of cases. I believe there will be many other patients like this one who will owe a debt of gratitude to Dr. Huntington's ingenious suggestion of using the fibula to replace the tibia.

In Huntington's case the pronation of the foot necessitated the transfer of the lower end of the fibula as well as the upper. This was accomplished by a complete cross section of the fibula. Dr. Stone in his case split the lower end of the fibula so that an inverted Y shaped end was made one arm of which was still attached to the old end of the fibula and the other was supported on the lower end of the tibia. In my case there has been no tendency toward excessive pronation of the foot and as may be seen in the X ray the lower ends of the two bones appear to have become partially united of their own accord. The results in all three cases appear to have been equally good. It is particularly interesting to see that Huntington's idea that hypertrophy would occur in the transferred fibula is a practical fact and not a theorist's dream.

REPORT OF SATURDAY SURGICAL CLINICS FOR STUDENTS

HELD AT THE GERMAN HOSPITAL OF PHILADELPHIA, 1907 AND 1908*

BY JOHN B. DEEVER, M.D.,
OF PHILADELPHIA,
Surgeon in chief

DURING the 26 clinics 271 operations were performed on 215 patients, there being 94 operations upon 38 patients

Appendicitis.—Of the 104 cases of appendicitis, 42 were acute. Of these, 23 were males and 19 females. The appendix, acutely diseased, was removed in 6 patients operated for other conditions: one male with cholelithiasis, another male with fecal fistula, and four females with various pelvic maladies.

Of these 42 acute cases 10 had abscesses and 8 had fluid in the pelvis, whilst from another patient 500 cc of liquid feces escaped upon opening the abdominal cavity. Thirteen of the 23 non-abscess cases were operated upon in their first attack, and 11 of the 19 abscess cases in their first attack.

In 4 cases the appendix was not searched for, incision into the abscess cavity completing the operation. In one case a friable appendix was removed piecemeal.

Drainage was introduced in 24 of the 42 acute cases. The character of the drainage varied with the character and amount of the exudate. In one patient a cigarette drain was required on account of oozing, while in another as much as three pieces of gauze and one glass tube, the whole surrounded by rubber dam, was required because of associated tubo-ovarian disease. A glass tube in the pelvis was inserted in 11, or about one-quarter of the cases, while a rubber tube was used only twice. Most of the 24 drained cases were satisfactorily treated by gauze, variously disposed about the infected area. In the re-

* Read before the Philadelphia Academy of Surgery, February 1, 1909

maining 18 undrained cases the wound was closed with tier suture of iodized catgut reinforced now and then by through and through sutures of silkworm gut

The 18 leucocyte counts made in the 23 non abscess cases that is those in which the disease was strictly intra appendiceal showed 5 in which the figures ranged from 5 000 to 10 000 9 from 10 000 to 15 000 3 from 15 000 to 20 000 and one of 21 700 Of the 19 cases with exudate those in which the disease was extra as well as intraperitoneal counts made in 17 showed 8 in which the figures ranged from 10 000 to 15 000 7 from 15 000 to 20 000 one of 24 500 and one of 37 800 To put these figures another way of the 18 non abscess cases in which counts were made 14 were below 15 000 and 4 were 15 000 or more and of the 17 cases with exudate in which counts were made 8 were below 15 000 and 9 were 15 000 or more These figures are strikingly similar to those I presented last year

As regards the presence or absence of extra appendiceal abscess both extremes of the count alone are of value there being a large middle class in which the figures range from 10 000 to 20 000 as often in the non abscess cases as in the cases with exudate Taking the extremes we observe that below 10 000 there are more cases of *minus* pus and *plus* resistance than of *plus* pus and *minus* resistance What few counts there are very much above 20 000 almost certainly indicate *plus* pus and *plus* resistance With regard to resistance however more is learned from the differential leucocyte count

Microscopic examination in 38 of the 39 cases in which the appendix was removed showed acute interstitial in 6 in 4 of which it was suppurative acute ulcerative in 7 obliterative in 1 chronic with acute exacerbation in 14 chronic interstitial in 6 and inconspicuous lesions in 4 With regard to the case of obliterative appendicitis it must be remembered that in some people the lumen of the appendix is naturally obliterated and it is significant that this patient gave no history of any attack preceding the one which brought him

to the hospital. The histological diagnosis of "inconspicuous lesions" expresses doubt in the mind of the pathologist whether the disease was present in the organ examined, or, if not that, at any rate is mentioned out of courtesy to the operator. There were 14 cases diagnosed histologically "chronic appendicitis with acute exacerbation", and of these, 10 were in accord with the clinical history, while not one of the remaining 4 gave any history of previous attacks. On the other hand, the 6 appendices diagnosed histologically "chronic appendicitis" were all removed from patients either in the throes of, or just recovering from, an acute attack, and yet no mention of such an attack was made in the laboratory report. The former group of cases, namely, those four in which the microscopical findings of chronic appendicitis with acute exacerbation were not supported by the clinical history of previous attacks, may, as I observed last year, be accounted for by latent or masked infections of a very mild type.

Bacteriologically, *B. coli communis* predominated, but *S. pyogenes* and *B. pyocyaneus* were also found.

Careful consideration of these and of the histories of the chronic cases to follow shows that many patients who complain of dyspepsia or indigestion, constipation, or dysmenorrhœa are, in reality, subjects of the appendiceal syndrome.

The appendiceal history of one patient began two years previously, after an attack of enteric fever. The last acute attack was apparently the sequel of a mild throat infection. Four days previous to admission the patient took to bed with chills, sore throat, and aching in legs and arms. Two days later pain was felt in the lower abdomen, and was followed by nausea. At operation the appendix was acutely diseased at its tip. Last year I reported a case of tonsillitis and purulent parotitis which developed after the evacuation of an appendiceal abscess. This year a patient developed acute tonsillitis four days after operation for appendicitis with localized fibrinoplastic peritonitis, and sero-fibrinous exudate in the pelvis. In the first case, the infection *via* the throat was probably instrumental in developing the attack of

appendicitis The second and third cases as well as others I have described in the past year show that the effects of appendiceal pus may be manifested remote from the right iliac fossa

In two patients the acutely inflamed appendix was found to be associated with bilateral salpingitis Another patient operated upon for acute appendicitis was found to have in addition hydrops of the gall bladder caused by blocking of the cystic duct by a large stone Another patient exhibited in addition to acute appendicitis a dermoid cyst of the right ovary

One patient whose acute attack developed two days before the operation showed after abdominal section an acutely inflamed appendix which extended low down into the pelvic cavity where it was surrounded by much cloudy fluid Five days after the operation signs of intestinal obstruction developed the second operation showed angulation of the ileum in the right side of the pelvis caused by a recent moderately soft adhesion A hasty convalescence ensued This is the occurrence of one case of acute intestinal obstruction in 42 cases of acute appendicitis which is practically in keeping with our past experience in acute intestinal obstruction taking place under these circumstances

In this series of 42 cases of acute appendicitis there were 3 deaths all from diffuse peritonitis associated in two cases with perforation of the bowel Two of these patients had had their acute attack a week before they were brought to the hospital the third was admitted to the hospital with a fecal fistula of three months duration he having been operated elsewhere

Of the 62 cases of chronic appendicitis 21 were in males and 41 in females Of the 62 cases 37 were operated upon for chronic appendicitis alone while 25 were operated upon additionally for other conditions such as in 21 associated pelvic disease (which accounts for the predominating number of females) and in the remaining 4 cholecystitis cholelithiasis cancer of the liver and movable kidney respectively

The number of attacks in the 37 pure uncomplicated cases of chronic appendicitis was 1 in 7 2 in 6 3 in 3 4 in 4 5 in 1 9 in 1 16 in 1 32 in 1 and in 13 there were numerous attacks over an extended period of time a definite number however not having been stated

The patient who had the greatest number of attacks furnished a history typical of chronic appendicitis

For nine years he had had recurring attacks of abdominal pain, about three to four per year. During the six months previous to operation, he had six attacks, the last three weeks before. The attacks usually began suddenly at night, and the pain was at first general abdominal, later localizing in the right iliac fossa. He was usually nauseated, but seldom vomited. He was badly constipated, his bowels never moving without a laxative. Examination showed slight tenderness on deep palpation at McBurney's point. A much thickened and firm appendix was removed from behind the cæcum, to which it was closely adherent by a short, thickened meso-appendix.

In the complicated cases, it was impossible to differentiate the attack of appendicitis from those of the complicating condition, so the number of attacks cannot be stated.

The symptoms complained of in these 37 cases were, in 12, sudden, diffuse abdominal cramp, followed by nausea and vomiting and localizing shortly to the right iliac fossa. In 15 patients the attack began as sudden, severe cramps, or else as soreness in the right iliac fossa, with or without chill, nausea, or vomiting. Five patients complained most of pain or soreness in the epigastrium. In 4 cases the complaint was most definitely localized, and the remaining case suffered most from dyspepsia. Other prominent symptoms were, in 6 cases, indigestion, in 5, constipation, and in 4, dysmenorrhœa.

One patient gave himself appendicitis by dieting on hard-shell crabs, ham and cabbage, and ice cream, belly-ache appearing half an hour later, and then syncope. Another patient was operated upon in the second month of pregnancy.

In two patients there was a history of traumatism. One patient was struck on the abdomen in a railroad accident, while the other strained himself, both exhibiting, later, symptoms of appendicitis.

Tenderness at McBurney's point was almost constant, being present in 30 of the 37 uncomplicated cases. Rigidity

was not so frequent being present in only 7. The McBurney incision was used in 25 cases and the short rectus incision in 12.

The lesson learned from dealing with appendiceal abscesses is that nearly every subject of the same is also the subject of indigestion in fact all cases of appendicitis commence in acute indigestion. Therefore if a patient consults a doctor for supposed indigestion he should never be dismissed from the office without a thorough abdominal examination having been made otherwise should a subsequent attack occur which would cost the patient his life the doctor has placed himself in a position in which he is morally responsible.

In the 25 complicated cases of chronic appendicitis which complications be it remembered were pelvic in 21 microscopic examination revealed the appendix chronically inflamed in 11 the seat of obliterative appendicitis in 7 and of minor lesions in 7. These figures show that the appendix shares so often in disease of the uterine adnexa that I believe it should be removed in practically every case of this nature the risk to the patient being practically nil.

There was only one death in this series that of a patient who at operation was found to have carcinoma of the liver in addition.

NOTE.—In chronic appendicitis the case occurs in a percentage of cases pylorospasm which condition cannot be said to be due to the appendix until the upper abdomen has been opened and the findings prove negative. I have now had a number of these cases in which relief of the pain and discomfort in the epigastrium was permanent after removal of the diseased appendix.

Carcinoma of Appendix—To several other cases I have met with in the past decade I may add this example of appendiceal carcinoma.

The patient a German girl aged 27 suffered for two years from symptoms referable to the gall bladder such as pain in the right upper abdominal quadrant which radiated to the right shoulder one-time jaundice considerable tenderness and some rigidity about the right costal margin. Examination of faeces

showed a faint trace of occult blood The hæmoglobin was 78 per cent, leucocytes 6,500 Through a McBurney incision the appendix was removed Microscopic examination showed carcinoma

Cholelithiasis — There were 16 cases of cholelithiasis, 2 in males and 14 in females The youngest patient was 23, and the oldest 59 years of age

A history of definite infection preceding the onset of gall-bladder disease was obtained in 2 cases, in both of whom the infection was enteric fever This disease preceded manifestations of gall-bladder symptoms by six and ten years respectively In both cases, however, cultures from the gall-bladder proved sterile

The least number of attacks was two in 2 cases, next lowest four in 2 cases, then six in 2 cases, those in the remaining ten cases being designated as numerous All of the cases had pain, and this symptom was described in 15 of the cases as colic or cramp in the epigastrium, and in the remaining cases the pain simulated that of renal colic The pain was referred in 9 cases to the right scapula, and in 4 around the right costal margin to the back, while in the case that simulated renal colic it traveled towards the iliac crest Vomiting followed the pain in 13 of the cases, while 9 suffered from chills

Digestive derangements were frequent, there being gaseous eructations in 6, indigestion in 4, and loss of appetite, diarrhoea, and constipation in one each Four patients had to be very careful of their diet, lest an indiscretion precipitate an attack, and one patient even lived on milk and custards for three months before operation Four patients were subject to nocturnal attacks of gall-stone colic Too much stress cannot be placed upon the significance of seemingly insignificant symptoms referred to the stomach, for such is frequently the plaintive cry of calculi for liberty Sometime jaundice was present in 11 of the 16 cases

It is important to bear in mind that nearly all gall-stone possessors have stomach trouble, that is, that the early, the prodromal, the initial symptoms of gall-stone disease are referred

to the stomach the epigastrium. The failure to recognize this has been at the cost of many a valuable life due to late operation. In practically every article I have written on gall stone disease I have seized the opportunity to refute the false and not-to-be-proven statement that gall stones can exist without causing symptoms. Until this false assertion is erased from text books and no longer appears the authors of them will still have to share a responsibility. The early symptoms of gall stone disease are referred to the stomach upon these symptoms a diagnosis should be made and operation done at which time there will be practically no mortality. Fulness weight distention or oppression in the epigastrium coming shortly after eating within an half three quarters or an hour relieved by belching and disappearing entirely immediately upon vomiting are I might say pathognomonic.

NOTE.—The patient frequently complains of a sensation of tightness which if unrelieved by loosening of the clothing may become a pain. Relief is sometimes obtained by bending the body forward or as we used to do as youngsters with ordinary belly ache getting down on the stomach over a chair. Frequently at the end of a deep breath there is pain at the right costal margin. Sensations of chilliness after eating particularly in the latter part of the day are observed in a certain percentage of these cases.

Physical examination revealed tenderness at or near the gall bladder in 14 of the 15 cases rigidity of the supra umbilical portion of the right rectus muscle in 3 and involuntary spasm of the same on palpation in 2.

There were stones in the gall bladder alone in 7 patients in the cystic duct alone in 1 in the gall bladder and cystic duct in 4 in the gall bladder hepatic and common duct in 2 in the gall bladder and common duct in 1 and in the common duct alone in 1. In 2 patients the cystic duct was blocked sufficiently to produce hydrops. The ampulla of Vater was blocked twice. The largest single stone was in the gall bladder and measured 2.5×3.5 cm. the next largest were two stones in the common duct each 2 cm. in diameter. The largest number of stones in the gall bladder was 33 and in the

common duct, 32 One patient had passed numerous calculi in the course of her gall-bladder disease, and this is the patient from whose gall-bladder 33 stones were removed This case shows that while the passage of gall-stones at stool is of diagnostic value, yet it is of no aid in prognosis Perhaps the patient from whose common duct 32 stones were removed can serve to emphasize this point One of the 32 stones was the size of a hickory nut, and had any hopes of cures been based upon the hypothetic passage of this large stone, there would still remain, as shown by operation, 31 stones to be reckoned with

The walls of the gall-bladder were thickened in 5 cases the gall-bladder enlarged in 4, contracted in 3, and impacted with calculi in 4 Three cases illustrated variations in the gall-bladder contents, one case revealing thick and black bile, another the clear mucoid of hydrops, and another, whitish-yellow mucopus Adhesions, present in 12 cases, were described as pericystic in 1, pericholedochal in 1, between the gall-bladder and liver in 1, gall-bladder and stomach in 5, gall-bladder, liver, and stomach in 2, gall-bladder and omentum in 1, and gall-bladder, omentum, and colon in the remaining case In one case the gall-bladder was completely hidden by adhesions below the liver margin, the severance of which revealed a spontaneous fistula, the diameter of a goose-quill, between the gall-bladder and the stomach I sever adhesions only when their separation is indicated

Bacteriological reports returned in 14 of the 16 cases showed the gall-bladder sterile in 7, *B coli* from the gall-bladder in 3, *B coli* from the common duct in 1, unidentified bacillus from the common duct in 1, *B typhosus* from the gall-bladder in 1, and *B typhosus* from the common duct in the remaining case The patient from whose common duct the typhoid bacillus was obtained gave no clear history of enteric fever, unless being in bed 17 days with "gastric fever" be considered such Neither did the patient from whose gall-bladder the typhoid bacillus was obtained give any history of the disease, but in this case the identity of the culture was

proven because it was positive to agglutination tests by the Widal method the organism being agglutinated not only by the patient's own serum but also by serum from a positive typhoid patient

The following operations were done Cholecystostomy in 7 patients choledochostomy in 2 cholecystostomy and choledochostomy in 1 cholecystectomy in 4 and cholecystectomy and choledochostomy in the remaining 2 Further operations required were for conditions due to the gall stone disease itself lumbar incision and drainage of a pancreatic abscess in 1 case gastrorrhaphy for the case in which a spontaneous cholecystogastrostomy had occurred and posterior gastrojejunostomy for postoperative obstruction and for conditions due to other causes appendectomy in one patient for acute appendicitis in another for chronic appendicitis and curettage of the endometrium in one for granular endometritis

As for drainage it is unnecessary to report in detail for each case Whatever part of the biliary tract I invaded I drained with a rubber tube thus applying to cholecystostomy and choledochostomy After cholecystectomy the cystic duct is injected by a rubber tube and held there by a stitch and if this is not feasible the tube is placed in the common duct in order amply to drain any infection when present Tubal drainage is usually supplemented by a Mikulicz drain to absorb leakage should it occur and sometimes additional gauze drainage is required either in the subhepatic region or in the foramen of Winslow Latterly in place of carrying gauze down to the subhepatic space I place a glass tube in this space the tube being removed in 24 hours

Although numerical and coagulative estimations of the blood were made in all cases yet they proved after all of very little value to me

The only death occurred in a woman aged 50 with myocardial disease whose entire extrahepatic choledochal apparatus was badly infected and who died the day of operation from acute dilatation of the heart The myocarditis was to

my mind the result of the toxæmia consequent upon the infected bile passages

Cholecystitis—In addition to the cases of chronic cholecystitis and pericholecystitis associated with the 16 cases of cholelithiasis, there were 4 instances of non-calculous cholecystitis, one of which was acute, in a female, and the others chronic, in males. Two of the latter were associated with chronic interstitial pancreatitis, a diagnosis established only by the questionable method of palpation. Indigestion was a salient symptom in all these cases, and included epigastric heaviness and distress, gastric tympany with belching, meteorism, and constipation. In fact, one patient maintained a restricted diet for fear of precipitating an attack by gormandizing, and a dyspepsia of seven years' standing was relieved when adhesions between the gall-bladder and stomach were broken up, and the small, thickened gall-bladder drained. The gall-bladder was distended with bile in one case in which adhesions were present between it and the transverse colon, and in another was the seat of hydrops. Operation comprised cholecystostomy in 3 cases, which included the two of chronic pancreatitis, and in one of the latter choledochostomy was also performed. The remaining case required cholecystectomy, since hydrops was present in a chronically inflamed organ. Furthermore, a chronically inflamed appendix was removed from one of the patients.

Carcinoma of the Liver—Carcinoma of the liver was seen twice, in the patient from whom a chronically inflamed appendix was removed, which has been already referred to, and in another patient in whom it was secondary to carcinoma of the stomach and duodenum.

Pancreatitis—In addition to two cases of chronic inflammation of the pancreas, I have this year to report a case of acute pancreatitis, in which operation was followed by uneventful recovery. This patient has already been referred to among the cases of cholelithiasis.

A machinist, aged 27 years, suffered a year before operation from four to five attacks, at short intervals, of abdominal cramps,

which were largely confined to the upper abdomen. These attacks were moderately severe the pain lasting from two to six hours and were accompanied by slight jaundice. He was free from attacks until two and a half weeks before operation when there took place a very severe attack of epigastric pain with nausea and vomiting. This pain started in the epigastrium radiated throughout the abdomen and extended to the back and to both shoulders. With frequent exacerbations the pain and jaundice continued up to the time of operation.

Examination showed slight epigastric fulness spasticity of both recti enlarged liver and marked tenderness at Robson's point and to less degree over the entire right hypochondrium and the epigastrium.

Intra abdominal examination revealed adhesions between the gall bladder colon and omentum a thickened gall bladder containing calculi fat necrosis in the preperitoneal fat and in the lesser peritoneal cavity a soft fluctuating mass about the size of two fists which shoved the stomach forwards.

From the gall bladder were removed about 40 c.c. of whitish yellow mucopus and four large irregular grayish faceted stones and 24 smaller ones from the gall bladder and cystic duct. Drainage consisted of a rubber tube in the gall bladder and a cigarette drain in the subhepatic space. The bursal abscess was evacuated posteriorly and to the left carrying the direction in front of kidney and behind the peritoneum and consisted of 500 c.c. of bloody purulent fluid from which the colon bacillus was obtained. The culture from the gall bladder was sterile. It might be added that occult blood was found in the faeces and that the haemoglobin was 72 per cent the whites 11 500 and the coagulation time 10 minutes three days previous to operation.

The two instances of chronic pancreatitis were features in two of the cases of cholecystitis already referred to. In one case the gall bladder disease was of seven years standing and the head of the pancreas was nodular. In the other case the cholecystitis had existed two years and the pancreas was markedly thickened and the whole organ much firmer than normal with small localized areas of great density. That pancreatitis existed in these two cases was only presumed by

the feel of the organ The removal of a piece of the pancreas for histological examination I did not consider justifiable

Carcinoma of the Stomach—There were 5 cases of gastric cancer, of which 2 proved inoperable Four were males aged 39, 53, 54, and 64 respectively, and the remaining patient was a female aged 54 Family history of the malignancy was present in one case only, namely, that of a male whose sister died of carcinoma of the breast The ages of the carcinomata were, of course, beyond calculation, but symptoms referable to the disease had existed for 2, 7, 11, 24, and 24 months respectively

Dyspeptic symptoms were common and included gastric distress and abdominal distention with belching and borborygmi after eating, epigastric pain, acid eructations, and constipation Vomiting, present in three cases, resembled coffee-grounds in two, and was obstructive in one of the latter One patient lost 20 pounds in 6 months, and another 30 pounds in three months

A distinct tumor could be palpated clinically in 2 cases Anæmia, present in 3 cases, was the equivalent of 44 per cent, 51 per cent, and 53 per cent of hæmoglobin respectively Free hydrochloric acid was present in 4 cases, in 3 of which lactic acid was found, and occult blood was present in 3 cases, in one of which it was found in the stool

Since the site of the cancer determined the operative procedure in each case, I shall consider these captions together, and abstract each case *seriatim*

CASE I showed a band of adhesions between the gall-bladder and the lower surface of the pylorus, many adhesions about the pylorus and first part of the duodenum, and a small, hard tumor on the lower surface of the pylorus This case indicated gastrectomy, so a segment which included the pyloric two and a half inches of the stomach, and the proximal two inches of the duodenum, was removed The operation was completed by gastrorrhaphy and posterior no-loop gastrojejunostomy Recovery was uneventful Histological examination of the tumor revealed adenocarcinoma

CASE II revealed inoperable carcinoma of the lesser curvature of the pylorus for which posterior no-loop gastrojejunostomy was performed in palliation. A week later sudden cardiac failure occurred.

CASE III showed carcinoma involving the pylorus the first part of the duodenum the lumen of which was nearly completely occluded and the liver. Posterior no loop gastrojejunostomy. Patient lived but a few days.

CASE IV exposed an extensive carcinoma which infiltrated the greater curvature and posterior wall of the stomach. The pylorus was patulous. Nothing was done.

CASE V exhibited a large firm nodular neoplasm of the stomach extending into the pylorus for about two inches. The regional mesenteric lymph nodes were enlarged. The transverse colon was thickened and infiltrated for a width of four inches. Since this was manifestly inoperable the patient was discharged unimproved.

Ulcer of the Duodenum—There was one case of chronic duodenal ulcer.

A Russian tailor aged 33 six months before operation suffered from sudden sharp cutting pain which started in the epigastrium and radiated around the right costal margin to the spine of the right scapula. This pain lasted two hours and was attended with nausea and vomiting. These attacks occurred at intervals of from two to three weeks until two weeks before operation since which time they have appeared almost daily but varied in severity. Between attacks there was pain in the right hypochondrium upon exertion.

Clinical examination revealed tenderness in the epigastrium and right hypochondrium but most acute at Robson's point. Free hydrochloric acid 22 total 41 occult blood negative. Intra abdominal examination revealed a dense mass of adhesions the size of a lemon intimately connecting the pylorus omentum bile duct arch of the duodenum and head of the pancreas. The lumen of the duodenum was encroached upon just beyond the pylorus. The stomach was slightly enlarged and the gall bladder distended with bile.

The usual operation of posterior no-loop gastrojejunostomy

resulted in cure. In such cases it is often difficult to determine whether the tumor mass is malignant or benign.

Fecal Fistula—There were two cases of fecal fistula after operation for appendiceal abscess, occurring three and ten months. One rent was in the ileum, one inch proximal to the ileocæcal valve, and the other was in the cæcum. Operations of closure of the openings and lateral ileocolostomy were done in both, and appendicectomy in one, under which heading this case was referred to above. Both patients died.

Intestinal Obstruction—Acute intestinal obstruction occurred in a patient who had been operated upon five days previously for acute appendicitis, under which the case has been referred to.

At 11 30 A.M. on fifth day after operation patient vomited a small amount of greenish material, and complained of slight abdominal pain. At 2 30 P.M. he vomited greenish fluid and had marked abdominal cramps. He was very restless. At 6 P.M. he vomited considerable amount of dark brown fluid. Although the bowels moved slightly and considerable flatus was passed through a rectal tube, he remained much distended and complained of much abdominal pain. A high enema did not move the bowels.

Operation relieved an angulation of a coil of ileum in the pelvis by a recent soft adhesion.

In cases of intestinal obstruction following appendicitis, where loops of bowel are glued together by fibrinoplastic exudate, I have obtained excellent results by uniting adjacent coils by entero-enterostomy. The following case will illustrate the advantage of this procedure.

Boy. Acute Perforative Pelvic Appendicitis. Operation showed in addition to the perforated appendix a pelvic peritonitis with pus. Gauze and glass tube drainage. For ten days everything went along normally. On the forenoon of the tenth day patient was attacked by abdominal cramp and nausea, with inability to pass flatus. I saw him in the early afternoon and

opened the abdomen when practically all of the coils of small bowel occupying the pelvis were very adherent causing obstruction. Adherent coils of bowel released when the collapsed portion immediately distended. Abdomen closed patient immediately relieved passed gas etc. The following afternoon a return of the obstruction symptoms immediately I opened the abdomen and made an entero-enterostomy between the loop of small bowel to the proximal and the loop to the distal side of the obstructed coils which corresponded to those found adherent and obstructed the day previous. Recovery. I have done this a number of times when nothing else in my judgment would have resulted in the recovery of the patient.

Intestinal Neurosis—One case presented as follows

A girl aged 16 whose appendix had been removed five months previously complained of pain about the incision and at times in the lower left abdomen severe enough to cause vomiting. Furthermore there were attacks of cardiac palpitation with shortness of breath.

Examination revealed marked tenderness and rigidity in the right iliac fossa just external to the old scar and moderate tenderness on the opposite side.

Abdominal section did not show adhesions nor any other abnormality. The old scar was excised and the patient made a good recovery. This method of dealing with such cases seems necessary at times.

Hernia—Of the 10 operations for inguinal hernia 9 were in males 1 in a female. Six were on the right 2 on the left side and 2 bilateral. A history of traumatism in 2 cases. The duration varied from 4 weeks to 6 years. Two of the hernias were recurrent.

There were 2 cases of femoral hernia both in females and both left sided. One patient was operated upon at the same time for chronic appendicitis and bilateral pyosalpingitis.

There were 3 cases of incisional hernia 1 in a male and 2 in females. All had been operated for appendiceal abscess drainage having been used. From one patient both tubes and

ovaries were removed on account of bilateral suppurative salpingitis and acute oophoritis with cystic degeneration

Wandering Kidney—There were 2 cases of wandering kidney, one in a male, on the left side, and the other in a female on the right side

A Russian weaver, aged 23, began to have pain seven months previous to operation, in left lumbar region, pain was constant and dull, and referred anteriorly to the left inguinal region, at times sharp and sticking. Also suffered from loss of appetite and constipation. Examination revealed the left kidney distinctly movable and palpable. The kidney was hammocked by a gauze sling beneath its lower pole, and three additional pieces of gauze were placed about it.

The history of the other patient, a female aged 32, refers only to symptoms produced by the chronic appendicitis, for which she was also operated upon. The right kidney was freely movable, but if it was giving rise to any symptoms they were overshadowed by those of the chronic appendicitis. It seemed rational, since the appendix was to be removed, to anchor the kidney also, in prophylaxis against the psychasthenic state that too often follows the self-discovery of such a misplaced organ. The triangular flap of the true fibrous capsule was separated, twisted, and sutured into the anterior layer of the lumbodorsal fascia and quadratus lumborum muscle.

Pyonephrosis (Renal Calculus)—On a priori grounds, this case should be classified under nephrolithiasis since the latter was the forerunner of the pyonephrosis.

The patient, a male aged 44, passed 87 biliary calculi eight years previous to operation. Seven months before, a stricture of the urethra, which resulted from an attack of specific urethritis, was cut.

Four years before the kidney operation the patient had an attack of chills and fever, and such an attack was repeated at irregular intervals, four or five times a day for two weeks. There was a feeling of uneasiness in the left groin, which was suddenly relieved by the passage of half a pint of greenish-yellow

pus Since then he has always passed small amounts of pus and mucus *per urethram* After exposure to cold there was discomfort about the left kidney region He never had hæmaturia although the Rontgen rays showed five calculi

At operation an enlarged kidney was found and calculi palpated The kidney was removed and gauze drainage placed The laboratory examination reported chronic pyonephrosis

Ureteral Calculus—One case was operated on

A male age not given had a sudden attack of severe pain in the right side of back just below twelfth rib one year before admission Pain traveled diagonally downwards and became generalized over the abdomen Altogether there were six such attacks of which four were very severe each attack except the first was accompanied by vomiting Last attack occurred the night before admission

Rectal examination revealed a hard slightly tender nodule high up on the right side of base of bladder probably a stone in the lower portion of the right ureter

At operation the right ureter was found dilated to site of obstruction A small stone was found in the vesical end of the ureter 4 cm from its termination it was pushed upwards and removed

Hypertrophy of the Prostate Gland—One case was operated on

The patient age 71 led a catheter life for 20 years Through out the latter half of this stage he urinated at two or three o'clock mornings Up until five years before operation he occasionally urinated in dribbles since then he has been compelled to use the catheter five times daily A month before admission noticed a dark red bloody appearance of the urine this cleared in three days Four days thereafter there was an ammoniacal odor to the urine Four days before admission again noticed blood in urine and since has had much hæmaturia

Operation perineal prostatectomy the small size of the prostate endorsing this route Histological examination revealed parenchymatous prostatitis Hæmoglobin estimation was 68 per cent being lowered by hæmaturia

Goitre—Two cases of simple goitre, both in females. The mother and two sisters of one of the patients had small goitres.

About thirteen years before admission the patient noticed a swelling upon the left side of the anterior surface of the neck, which gradually increased in size. Five years later swelling appeared on the right side, this is now the larger. Patient complains of throbbing pain on exertion and, after any excitement, tumors interfered somewhat with breathing.

Examination showed, in the midline, a freely movable goitre, about three inches in width. On the left side of the neck, but higher, was a smaller tumor, both followed the movements of the larynx in deglutition. On auscultation, a rough sound was heard all over the chest, from encroachment of the goitre upon the trachea. The goitre was extirpated through a horseshoe incision, and the field of operation upon the gland painted with carbolic acid, and this followed by alcohol. Histologic examination showed the goitre to be cystic.

The other patient noticed, five years previously, that the circumference of her neck was increasing, there was no localized swelling. Gradually the tumor developed in the thyroid region and in the midline.

Examination revealed a central, symmetrical, painless, smooth tumor occupying the midline of the neck, extending from side to side the width of the neck, and almost filling up the anterior cervical triangles. Just to the left of this is a smaller, almost unrecognizable prominence, which was probably the left lobe of the thyroid. The tumor had the consistence of a tense cyst. The heart sounds were transmitted to the tumor. The voice was high pitched and husky.

After removal of the goitre the field of operation on gland was painted with carbolic acid, followed by alcohol.

Histological examination showed that the walls consisted of degenerated fibroconnective tissue, necrotic towards the centre, better preserved and more vascular towards the periphery, and here too, were a few atrophic acini with colloid contents.

Carcinoma of the Breast—But one case of carcinoma of the breast happened to fall into the clinics this year, but the remaining cases I shall report with a large series later on.

A woman aged 40 was accidentally struck on the left breast about four weeks previous to admission since then there has been a painful hard tumor in the breast Examination showed in the left upper quadrant of the left breast a hard palpable tumor the size of a walnut No enlarged axillary lymph nodes were palpable Radical operation was performed and a rubber tube used for drainage Histological examination showed carcinoma but there were no metastases in the lymph nodes examined

Fibroid of the Uterus—Three cases of fibroid tumor of the uterus in women aged 36 47 and 49 respectively Duration of disease 8 12 and 24 months Dysmenorrhœa was present in all cases leucorrhœa in two menorrhagia in one and metorrhagia in one while one patient suffered from frequency of micturition The operations were complete abdominal hysterectomy in two cases and supravaginal amputation without the adnexa in the remaining case All the patients had more or less anemia the hæmoglobin estimation amounting to 42 70 and 78 per cent. respectively

Histological examination revealed in one case fibroleiomyoma and endometritis in another fibroleiomyoma hyperplastic endometritis metritis chronic salpingitis and chronic cystic oophoritis and in the third hyperplastic glandular endometritis fibroid metritis with considerable hyaline degeneration of connective tissue and atrophy of the muscular layer marked arteriosclerosis and chronic oophoritis and cyst formation

In fibroid uterus on account of risk of carcinomatous change it is always a question whether to do a complete or partial removal of the uterus Personally I am of the opinion that the greatest good will be accomplished by complete removal in all cases The sense of touch and the naked eye appearance of the cervix is not sufficiently reliable to decide the question In a few cases in which I have operated lately doing a supravaginal amputation the pathological report has come back Commencing carcinomatous degeneration

Displacements of the Uterus—There were 5 cases of retroversion and one of ante flexion of the uterus Appendicectomy for chronic appendicitis was performed incidentally upon all of these patients except one with ante flexion The operations were intra abdominal shortening of the round ligaments in 3 cases ventrosuspension in one and ventrofixation in one Two of the cases of retroversion had associated

tubo-ovarian disease. The case of antelexion was treated by dilatation of the cervix. There were 4 cases of uterine prolapse, and the operations performed were vaginal hysterectomy with apposition of the stumps of the broad ligaments in 2, and ventrofixation in the other two. One of the latter group required trachelorrhaphy, and one of the former group perinorrhaphy, appendectomy for chronic appendicitis, and resection of a right cystic ovary at the same time.

The two uteri that were removed were examined histologically and one showed chronic fibrous metritis and endometritis, while the other showed metritis, endometritis, arteriosclerosis, hyaline degeneration, atrophy of muscles, and thickening of the squamous epithelium of the cervix. From the pelvis of one of the hysterectomy patients there was evacuated, a week after the operation, a considerable amount of old clotted blood and some pus.

Prolapse of the Vagina—Vaginal prolapse occurred in a patient who had undergone vaginal hysterectomy nine months previously.

The patient complained of lack of pelvic support. Operation consisted in transfixing the round ligaments in two places, bringing them towards the midline, and suturing them to the vaginal wall. On account of bilateral cystic disease of the ovaries, bilateral salpingo-oophorectomy was also done.

NOTE.—In all cases of hysterectomy, complete or incomplete, abdominal or vaginal, the stumps of the broad and round ligaments should be carefully attached, and sewn into the cervix when supravaginal amputation has been made, to the walls of the vagina, when complete abdominal hysterectomy is done, and apposed to each other in vaginal hysterectomy, otherwise vaginal prolapse will occur.

Chronic Metritis and Endometritis—There were 8 cases of chronic metritis and endometritis, of which four have already been referred to, two under fibroids and two under prolapse of the uterus. Of the remaining 4 cases, two were associated with chronic salpingitis and chronic appendicitis, and one with pyosalpingitis.

This last patient a young woman aged 20 showed clearly the ravages of gonorrhœal infection. Four years previous to admission she had an abortion and two and a half years later profuse yellowish vaginal discharge. A year before admission she had had her appendix and left tube and ovary removed in San Francisco. Examination of the vaginal discharge revealed Neiser's organism. Hæmoglobin 52 per cent white blood cells 19 600 per cm. Abdominal section showed an enlarged boggy uterus surrounded by chronically thickened tissues and dense adhesions. The uterus with the right tube and ovary removed.

The remaining patient a Russian aged 32 had had six children of whom four were premature. She complained of dysmenorrhœa with excessive flow. She had been curetted four times and trachelorrhaphy had been performed all without relief from symptoms. The uterus was removed by the vaginal route and when examined showed in addition to chronic hyperplastic glandular endometritis some irregular glandular proliferation and beginning infiltration of the myometrium. This would have been a fertile field for the development of cancer.

In addition to the above case chronic metritis alone was found in a patient with bilateral chronic salpingitis.

In this series of 9 cases hysterectomy was performed by the supravaginal route in six and by the vaginal in the other three.

Curettage for endometritis was done three times in the course of operations for other lesions. Of three uterine polyps excised from three other patients one was myomatous another submucous fibroid and the third was organized blood clot. Dilatation for cervical stenosis was necessary twice trachelorrhaphy four times and perineorrhaphy twice.

Disease of the Tubes and Ovaries—There were 11 cases of chronic salpingo-oophoritis in 10 of which there was associated appendicitis in 3 of the cases there was chronic metritis and endometritis with fibroids in 2 and a dermoid cyst of the

This case illustrates well the remarks I made in the clinical report for the previous year. This may be thought to be too radical treatment but it is the only one which the patient was subjected to.

right ovary in one. Excepting this last case the disease was bilateral in all, and double salpingo-oophorectomy was performed, with supravaginal hysterectomy in the 3 cases of associated uterine disease.

There were 3 cases of chronic salpingitis, and one case of pyosalpingitis. Two cases were associated with appendicitis, 2 with chronic metritis and endometritis, one with chronic metritis, and one with retroversion of the uterus. Both tubes and ovaries were removed, except in one instance in which a portion of the left ovary was left. Supravaginal hysterectomy was done in 3 of these cases, and ventrosuspension in the fourth.

There were 3 examples of chronic cystic oophoritis, one bilateral, one right-, and one left-sided. Associated conditions were chronic appendicitis, retroversion of the uterus, and endometritis in one, chronic appendicitis, prolapse of the uterus, and lacerated perineum in another, and prolapse of the vagina in the third.

There were 5 cases of ovarian cysts, 4 on the right and one on the left side. Appendicitis was present in all cases. The cysts were simple in 2 cases, dermoid with chronic salpingo-oophoritis, in one, papillomatous (adenocarcinoma), in one, and tuberculous in one case. In 3 cases of unilateral and 2 cases of bilateral salpingo-oophoritis, salpingo-oophorectomy was done. Pelvic abscess was evacuated by vaginal incision in 2 patients.

There was one case which resembled closely ectopic gestation for which complete supravaginal hysterectomy was performed, and also appendicectomy. Histological examination revealed hemorrhage and necrosis, no evidence of decidual tissue.

In addition to the operations described above, 49 others of less interest were also performed in the clinics.

THE VOLUNTEER MILITARY SURGEON *

BY WILLIAM G LE BOUTILLIER M D

OF NEW YORK CITY

THE organization of the United States Army Medical Reserve Corps and the acceptance of commissions therein by some prominent members of the medical profession has some what revived an interest that was keen ten years ago in the Medical Department of the Army and the efficiency of its professional work.

Practicing physicians are exempt from service with the militia in time of peace but are liable for military duty in case of war insurrection invasion or imminent danger thereof if more than eighteen and less than forty five years of age Those who are not enrolled in the National Guard organizations (or organized militia) form part of the Reserve Militia In the event of being called into service they must serve as enlisted men unless commissioned as officers

The number of medical officers in the army has been so small that it has been the custom for years in time of peace to employ additional medical men who were known as contract surgeons In time of war there were also commissioned in the volunteer army a large number of physicians and surgeons In addition the Red Cross organizations have furnished both material and personnel to fill the gaps that were left by the government's preparations to care for the sick and wounded

In 1901 the authorized commissioned strength of the medical department was fixed at 321 In 1908 changes in the organization were made and a Medical Corps to consist of 445 officers was authorized In addition a Medical Reserve Corps was created in which many former contract surgeons were commissioned and placed on active duty but the use of the contract surgeon was not abolished In the event of war

it would still be necessary to call from their occupations in civil life a large number of physicians and surgeons, to become medical officers in the organized militia, the volunteer forces, and the Medical Reserve Corps not already on active duty, or contract surgeons

When the armed forces are expanded to the extent necessary for a war of any magnitude, the authorized number of officers in the medical corps is not more than sufficient to provide a skeleton framework of the medical body required. It must be added to in the other classes just mentioned. The number of medical officers necessary for an army of 1,250,000 has been estimated at about 28,000. It is, therefore, a matter of some interest and importance to us all to have some idea of the duties of the officer commissioned in the Medical Corps of the army, of what is expected of the volunteer, and of what part of the duties of a military surgeon the latter is fitted by his previous training to perform.

By army regulations the Medical Department is charged with the duty of investigating the sanitary condition of the Army and making recommendations in reference thereto, of advising with reference to the location of permanent camps and posts, the adoption of systems of water supply and purification, and the disposal of wastes, with the duty of caring for the sick and wounded, making physical examinations of officers and enlisted men, the management and control of military hospitals, the recruitment, instruction, and control of the Hospital Corps and of the Army Nurse Corps (female), and furnishing all medical and hospital supplies, except for public animals. So far as sanitary recommendations and the prevention of disease are concerned the powers and duties of the medical officer are principally advisory. In caring for those actually sick and wounded, and in training and disciplining the Hospital Corps and nurses, the Medical Department and its officers have a considerable measure of actual control. It is an anomalous condition of affairs that this real control should not extend to sanitation, and it seems to be due to the transition from a period when disease was regarded as a

visitation of Providence to the present one when most educated men believe that disease results from natural causes that can be discovered and that its occurrence can to a great extent be prevented by the enforcement of scientific measures

In the field the Medical Department is charged with the following duties

a The initiation of all hygienic measures to insure the good health of troops

b Management of epidemics among the inhabitants of the country under military control to prevent infection of new territory or of the army

c Care of the sick and wounded on the march in camp on the field of battle and after removal therefrom

d Methodical disposition of sick and wounded so as to assure the retention of those effective on the field of battle and to relieve the fighting force of the non effective

e Transportation of sick and wounded

f Establishment of new hospitals and utilization of old ones sufficient in number and capacity to care for all sick and wounded

g Supply of troops and hospitals with all articles needed for the sick and wounded

h Preparation and preservation of individual records of sickness and injury in order that claims may be adjudicated with justice both to the Government and the soldier

From a non military point of view these duties may be classed as sanitary medical and surgical transportation and supply

To initiate a hygienic measure a medical officer makes a recommendation to the line officer on whose staff he is serving and the line officer if he has the authority and chooses issues an order to be obeyed by those under his command Or the line officer may authorize the medical officer to correct sanitary defects

In 1898 the medical officer was rarely given support that was sufficient to produce results in sanitation that were satisfactory from the civilian standard

To perform the field duties of the military surgeon, not only is a medical training necessary, but also one in practical field sanitation. There is also required an intimate acquaintance with army methods, both of the Medical Department and of others, with which co-operation is constantly necessary. The amount of time requisite to obtain such training and knowledge may be judged from the course taken by a physician who desires a commission in the Medical Corps. After he has successfully passed a physical and professional examination in medical subjects, he is ordered to attend the Army Medical School at Washington, D. C., where he spends eight months. His final examination is on the subjects taught in the school: duties of Medical Officers, Medical Department Administration and customs of the service, military hygiene, clinical microscopy and bacteriology, military surgery, military and tropical medicine, sanitary chemistry, Hospital Corps drill, operative surgery, ophthalmology and optometry, X-ray work.

The course at this school is also open under conditions to officers of the National Guard. At the present session I am informed there is but one such student from the whole United States.

A question frequently asked by medical men who have small acquaintance with army surgeons is as to their professional ability as physicians and surgeons. Undoubtedly they are very much better qualified than the average physician and surgeon. It is equally certain that they can have in very few cases an amount of clinical experience equal to that of the average practitioner who lives by his practice. For example, the average opportunity of a member of the Medical Corps to do operative surgery may be judged from the following data from the report of the Surgeon-General for the fiscal year ending June 30, 1908, in connection with the statement that on June 30, 1908, there were 301 officers in the Medical Corps and 179 contract surgeons, a total of 480 medical men in service.

There were reported as having been performed by medical officers upon the officers and enlisted men of the Army 3009

operations a fraction more than eight per day Of these operations there were for appendicitis 142 for hernia 150 for abscess of liver 30 major amputations 14 for cholecystitis and gall stones 8 More than one half of the total list of operations is made up as follows circumcision 343 for varicocele 136 for hydrocele 48 amputations of fingers and toes 63 for varicose veins 36 for hemorrhoids 212 for fissure of anus fistula in ano ischio-rectal and perirectal abscess 70 for inguinal adenitis 640

The army surgeon's operative surgery is somewhat limited in quantity It is of interest to note that in the same year there were 154 admissions for gunshot wounds and 2832 admissions for wounds other than gunshot The grand total of cases was 60 897 of admissions 65 546

The method of organization of a hospital in the army differs considerably from the civilian method The senior medical officer is in command and combines the duties usually performed by a superintendent warden or Board of Trustees or all of them with those of a visiting physician and surgeon He controls the assignment to duty of all medical men nurses attendants clerks and employees in the hospital is responsible for obtaining shelter food clothing medicines and all other supplies for patients and attendants and for the preservation of all the buildings and public property at the hospital He has to account for all officers and men on duty and the patients on the hospital roll as well as for the property even to a broken thermometer a lost spoon or fork He has a larger financial responsibility than most hospital superintendents while in civil life the hospital surgeon or physician as a rule has none and he is also responsible for the professional care of the patients which a hospital superintendent rarely is

There is another important difference in organization in the assignments of junior medical men to duty Unless my observations have been faulty it was the custom in the large hospitals in 1898 and would be the custom to-day in the event of war to assign each medical man to the care of a

certain number of patients, wards, or tents, without any differentiation and classification of duties such as is common among members of a resident staff in a civilian hospital. Each medical officer or contract surgeon, attended as a rule both medical and surgical cases, took and recorded their histories, made what laboratory examinations were made, and performed what dressings and minor operations were necessary. If the assignments of varying duties to internes and the visiting staff in civilian hospitals are right and economize ability and time, the distribution of duties that was habitual in the army hospitals must be wrong, as the special abilities of individual medical men were not sufficiently considered in assigning them to the care of cases to produce the best results for the patients. For major operations at the large military hospitals it is customary to designate one surgeon as operating surgeon, and occasionally the laboratory was specialized. But in general the Medical Department appears to ignore different capacities in its medical officers other than operative, and to prefer to hold each man of the same grade or title equally competent for every medical duty and variety of case, and to dislike the specialization which makes them less interchangeable parts of the medical organization.

To be effective, the military surgeon who commands a hospital must add to his medical and surgical knowledge a large amount of executive ability and technical knowledge of military administration. As he rises in rank he apparently tends with the lapse of time and the performance of these executive duties to become less and less of a clinician. The volunteer military surgeon who has not had training in the methods of military administration can be of value in only the most subordinate military positions. Most medical volunteers will probably be utilized at the large hospitals.

With the expansion necessary in time of war, the services of a large number of practitioners to treat the sick and wounded become necessary, and also of a large number of officers who are able to perform the necessary administrative work. The latter class are to a certain extent being trained

in the National Guard They can learn the methods and relations of the different departments of the army and they get a little practice in field work at camps and manœuvres Meanwhile they continue to engage in practice and to extend their clinical experience But when all were utilized there would remain a great deficiency of trained medical officers as serious as existed in 1898 for the all important executive work In the event of a war occurring within a short time one could not expect other than a repetition of the failures of that time There is little doubt that not many months ago war was actually imminent

As yet the responsible powers have failed to make the authority and resources of the Medical Department adequate Nor is it likely that the necessary measures will be enacted unless the Medical Department is strengthened by the support and assistance of the medical profession throughout the country and the force of a public opinion determined to prevent the sanitary shortcomings of the Spanish American War The responsibility for the organization of the Medical Department and for providing supplies for its use rests upon the Congress The responsibility for asking for supplies and more power rests upon the Medical Department Upon the medical men of the country rests the responsibility for intelligently advising the public as to what action it should demand that Congress take to strengthen the Medical Department

The work of the Medical Department in the field is divided into the service of the front regimental aid field hospitals and advanced medical supply depots and of the rear stationary hospitals and rest stations on the lines of communication base or general hospitals convalescent camps casual camps base medical supply depots It is a gain to have a Medical Reserve Corps even if untrained if one can thereby secure for emergencies as of battle and for the service of the rear the abilities of active men of experience and exclude the incompetent by reason of youth and inexperience and the derelict by reason of age habits or general professional incompetency But the security it gives against the emergencies of war time

is only fancied, unless there is a reserve under training for the service of the front. With the National Guard regiments their own medical officers will doubtless be at the front, where the untrained officer of the Medical Reserve Corps would usually be only in the way.

For the general surgeon who contemplates offering his services to the government in war, the useful place is in the stationary, base, or general hospitals at the rear, not with the troops in their camps. After a battle, which is an accident in the normal life of an army, like a railroad or other disaster in civil life, the only operations that should be done nearer the firing line than a stationary hospital would be ligations of blood-vessels and a few other imperative procedures, as the requirements of modern asepsis cannot be met near the firing line. For such operations the field hospitals should care as best they may. At times, and when the battle is over, a field hospital may become or be replaced by a stationary hospital, and the skilled volunteer surgeon from civil life moved to this place from his ordinary station. But almost always the important thing after a battle is to remove the wounded as soon, as quickly, and as far as possible to the rear, where necessities and conveniences can be provided conformably to the standards of civil life.

In time of war and such emergencies of battle, to enable the volunteer physician to be of the fullest use in the actual care of sick and wounded, it is not necessary that he should be commissioned with high rank. But there is no reason why when he is commissioned in the Medical Reserve Corps he should not be graded as a consulting surgeon, physician, bacteriologist or sanitarian, as an attending physician, or surgeon, etc., or as a junior surgeon or physician. When ordered to any hospital or camp the commanding officer would then place him on the duty for which he was particularly fitted by his daily work, in accordance with which fitness his commission should be granted. The pay authorized in these various grades should be specified, and increased with the value of the services to be performed.

Many railroads maintain an equipment and organized personnel that can be promptly brought into action at any point on its lines and hospitals at points selected as their base. Similar organizations can be prepared by the Medical Department of the army if authorized. Particularly there should be permanently organized field hospitals and other transportation units with their own personnel both commissioned and enlisted. The authorized enlisted strength of the Hospital Corps does not to day permit maintaining permanent field hospitals or ambulance company sections that can acquire traditions and an *esprit de corps*. When needed their personnel is hurriedly assembled as well as their equipment and their work must necessarily lack the smoothness of action that is developed in a permanent civilian hospital with traditions and a long history of achievements and difficulties surmounted.

To sum up

The volunteer medical officers who are partially trained by service with the organized militia and at camps should be utilized in the service of the front.

Other volunteers are only of much value in the service of the rear where the hospital organization should be more highly specialized to make the best use of them. Here the pay should be in proportion not to the rank but to the value of the services the volunteer is able to furnish as a practitioner caring for the sick and wounded.

The numerical strength and the authority of the Medical Department should be increased and physicians and surgeons who desire to have a performance equal to our knowledge of sanitation and medical science should take an active interest in the reforms that are necessary to bring this about.

We have a personal interest as we are subject to the militia law and liable to be called upon to serve in the event of war.

TRANSACTIONS

OF THE

NEW YORK SURGICAL SOCIETY.

Stated Meeting, February 24, 1909

DR CHARLES N DOWD in the Chair

APPENDICITIS, PORTAL PHLEBITIS AND ABSCESS OF THE LIVER

DR PARKER SYMS presented a man of thirty-eight who was admitted to the Lebanon Hospital on September 3, 1908, with a typical history of acute appendicitis. The only noteworthy feature of the history was that the patient had had a severe chill on the day before admission.

On September 4 he was operated on by Dr Henry Roth, who removed an inflamed appendix. There was nothing special about the operation, and apparently nothing unusual about the case. The appendix had not perforated.

After the operation, instead of proceeding toward recovery, as such cases usually did, this patient had a series of chills, with high fever, and presented a typical picture of pyelophlebitis. This condition of chills alternating with high fever lasted many weeks and, finally, there were indications that a local suppurative process had been established. The diagnosis of abscess of the liver was made, and the patient was operated on by Dr Syms on November 11, 1908. In the right lobe of the liver, two large non-communicating abscesses were found, and, judging by the appearance of the pus, one of the abscesses was of much more recent origin than the other. These abscesses were opened into each other and thoroughly drained.

The patient began to improve from the date of the operation, and continued to complete recovery.

Dr Syms regarded this as a unique case, as this condition was usually fatal.

DR DOWD raised the query as to the frequency with which abscess of the liver follows an appendicitis a condition to which Dr A G Gerster had called attention a few years ago He believed that it was not very uncommon He also suggested the possibility of a thrombosis or other infective process extending to the liver and not ending fatally or even in abscess formation He had operated upon one case which he believed to be of the latter variety A boy about whose appendix there was a very small abscess developed after appendectomy marked fever and rigidity and accompanied by discomfort in the supra appendicular region These symptoms subsided after a prolonged illness and he then began to have ascites On operation there was no evident cause for the ascites The omentum was stitched to the parietal peritoneum however after the method of Talmz and a complete cure followed The boy is now in vigorous health He believed that there had been an infection from the appendiceal abscess which had extended to the liver and obstructed the hepatic circulation but which had not produced abscesses

DR WALTON MARTIN said that last summer he saw a patient who after the removal of a gangrenous appendix did fairly well for ten days and then developed a temperature and died in the course of five weeks The autopsy showed multiple abscesses of the liver which apparently had their origin at the site of the appendix The symptoms were those of suppuration and there was slight enlargement of the liver although the true state of affairs was not suspected until after death

DR GEORGE WOOLSEY said that a number of cases in which this complication occurred had recently been reported in Boston Personally he could recall but a single case in which an abscess connected with the liver developed after an operation for gangrenous appendicitis with quite an extensive spreading peritonitis The patient made a fairly good recovery after removal of the appendix and then began to run a temperature and complain of pain over the liver It was difficult to elicit this pain but finally it was unmistakable The temperature was of a septic character and a subphrenic abscess was suspected Upon opening the abdomen on the right side he found an abscess which was quite superficial but which evidently involved the substance of the liver The patient made a good recovery This was not a typical case of abscess of the liver and possibly the infection extended

along the peritoneum and then localized itself in the location where it was found

DR WILLIAM G LE BOUTILLIER recalled one case of infection of the liver after gangrenous appendicitis The patient, a woman, did well for eight or ten days after the operation, and then developed a chill and temperature and finally died in a septic condition The autopsy showed a suppurative thrombosis of the portal vein, and the infection could be traced down through the veins to the appendix There was no abscess of the liver itself

DR CHARLES L GIBSON said that during the past summer he saw a patient who had been operated on for appendicitis by another surgeon The case did badly after the operation, and gave evidences of a suppurative condition of the liver He was seen by a number of men, most of whom agreed that there was an abscess of the liver The case resulted fatally and nothing was found in the liver after death

Dr Gibson said that in a case of abscess of the liver seen a number of years ago, rupture of the abscess took place into the pleural cavity The patient lived for a long time, and finally died of exhaustion

FRACTURE, CRUSH OF RIGHT SUPERIOR MAXILLA

DR PARKER SYMS presented a man thirty-five years old who was admitted to the Lebanon Hospital on December 16, 1908 The history obtained was that he was injured by an elevator, his head having been caught between the car of the elevator and the floor Examination showed a complete crushing of the right superior maxilla, together with an extensive scalp wound over the left occipitoparietal region

The maxilla was so completely crushed that there was no probability of saving it or any portion of it It was thereupon excised through a Ferguson incision The skin was sutured with silk The patient made an uneventful recovery, and there was very little, if any, deformity

ACUTE PERFORATION OF GASTRIC ULCER

DR GEORGE WOOLSEY presented a man, twenty-five years old, who was brought to the Presbyterian Hospital on January 21, 1909, with the history that on New Year's Day of the present year, while at work he was seized with a sharp pain in the upper right quadrant of the abdomen There was neither nausea nor

vomiting Similar attacks of pain recurred daily usually while he was at work These attacks seemed to bear no relation to his meals

On the day of his admission about noon he had an unusually severe attack of pain in the same region and vomited for the first time He was much prostrated and when seen by the ambulance surgeon he was vomiting a black watery fluid This vomiting persisted up to the time of operation

The patient was operated on six hours after the onset of his acute pain and prostration The abdomen at this time was of a board like hardness An incision in the median line below the umbilicus revealed a large amount of free purulent fluid The appendix was brought into the wound and found to be normal It was returned to the peritoneal cavity and a second incision three inches long was made in the median line above the umbilicus The stomach presented and on its posterior surface was found a small round perforation about the size of the head of an ordinary tack from which gas and stomach contents were escaping Its edges were only slightly indurated The pylorus was narrow and constricted

The ulcer was closed with a purse string suture of plain catgut reinforced by Lembert sutures of silk and over this a tab of omentum was sutured

On account of the close proximity of the perforation to the pylorus the opening of the latter was so much narrowed that it was deemed wise to do a posterior gastrojejunostomy This was completed in the usual way and three additional catgut sutures were taken through the jejunum stomach and mesocolon to hold them in place A small opening was then made below through which the pelvis was thoroughly irrigated and drained The patient made an uneventful recovery and left the hospital on February 17

This case was shown Dr Woolsey said first because the symptoms preceding the perforation hardly indicated the presence of such a serious lesion and it was not at all typical of an ulcer of the stomach Prior to the first of January of the present year the patient had never suffered from gastric pain nor vomiting after eating he gave no definite history of any gastric symptoms and had never vomited blood The second reason for showing it was that Dr Deaver had recently made the statement

that he could find on record only 22 cases of acute perforation for gastric ulcer where primary gastro-enterostomy was done. This, Dr Woolsey said, struck him as being a rather small number. Of these 22 cases, the Mayos had reported 5, and in addition to the total number, Deaver himself reported 5, making 27 in all.

DR WILLIAM A. DOWNES said that in a case which he operated upon in the service of Dr Johnson at the New York Hospital during the past fall, the operation was done eight hours after the occurrence of the perforation. After closure of the perforation, there was such a degree of stenosis of the pylorus that a posterior gastro-enterostomy was necessary. The patient developed pneumonia, and died eight days later.

FRACTURED DISLOCATED HEAD OF RADIUS

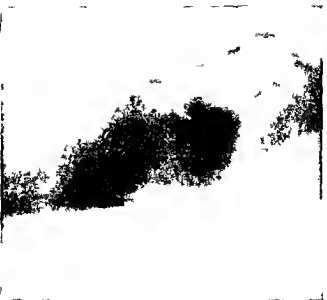
DR CLARENCE A. MCWILLIAMS presented a man, forty-five years old, who entered the Presbyterian Hospital early in November, 1908, with the history of having been injured ten days previously. While descending a ladder he fell, and saved himself with his outstretched right hand.

Upon admission to the hospital there was considerable swelling about the outer side of the elbow, and beneath the normal position of the external condyle some displaced fragment. All the movements of the arm were somewhat limited, but particularly pronation and supination of the forearm but no crepitus. An X-ray picture (see Fig 1) showed a complete fracture transversely through the neck of the radius near its junction with the head, with dislocation of the fragment, so that the cup-shaped articular cavity on the upper surface of the radius looked directly outwards.

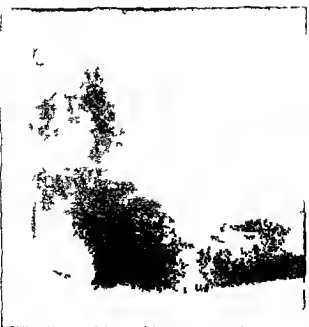
A small incision was made over the outer side of the joint directly upon the fragment. This showed that the head of the radius was entirely detached from the neck, and it was easily removed. Convalescence was uneventful.

The patient now had complete power of extension and flexion and very slightly restricted pronation and supination. He had resumed his work as a bricklayer, although the arm was still somewhat weak.

In connection with this case, Dr McWilliams referred to Stimson's statement that fractures of the neck of the radius were much rarer than those of the head. In his case there was also a triangular crack through the head, but with no fragment of it.



I—Sh w g po t f d pl d f gm t d i ma d by
th jury



II—C d i f How fi d i v u f gm t

FIG 2



Dr Sym's case of bullet in brain

DR CHARLES N DOWN after referring to the excellent functional result obtained in Dr McWilliams case said he had seen several cases of fractures about the elbow joint where fragments of bone were removed mostly from the external condyles and in those cases too the results were remarkably good as regarded function

BULLET IN BRAIN

DR PARKER SYMS presented a boy of twelve years who was admitted to the Lebanon Hospital on December 31 1908 The history obtained was that while at play one of his chums shot him in the head with a .22 calibre revolver the weapon having been held near the forehead The patient remembered nothing after the shooting He was semi conscious on admission His face was apathetic eyes normal no inequality of the pupils no conjunctival hemorrhage no convulsions reflexes normal

Examination—A little to the left of the median line over the nasal portion of the frontal bone there was a small perforated wound about the size of a pea from which was exuding blood and a whitish gray substance presumably brain matter An X ray picture was taken (Fig 2) which showed the bullet imbedded in the brain The wound of entrance was enlarged and dressed and nothing further was done The boy made an uneventful recovery and thus far has had no symptoms referable to the bullet in his brain

The X ray shows the bullet to be one half inch to the left of the middle line two and one-half inches above the plane of the occipital protuberance and one half inch from the posterior surface of the skull

DR WOOLSEY referred to a case of bullet wound of the brain in which the patient progressed favorably for ten or twelve days and then developed symptoms of acute suppuration which proved fatal in spite of operation In another case where a man shot himself in the temporal region complete blindness of both eyes resulted the bullet having apparently cut the optic nerve at the chiasm The man himself recovered but he remained permanently blind

THE VOLUNTEER MILITARY SURGEON

DR WILLIAM G LE BOUTILLIER read a paper with the above title for which see page 847

DR DOWD said he had once taken the opportunity to discuss this subject with the late Dr Fowler of Brooklyn, who was then surgeon-general of the State. He advanced the idea that one rational aid in the solution of the problem would be to have some kind of hospital service connected with service in the militia. Many States and counties contributed towards the maintenance of certain hospitals, and as they also bore the expense of the militia, it would be perfectly rational that the men who served as surgeons in the latter should also serve in the hospitals, and it should be understood that service in these particular hospitals carried with it certain military obligations. The militia surgeons would thus obtain a considerable amount of surgical experience in the course of their ordinary routine work and the positions would be more attractive.

Stated Meeting, March 10, 1909

The President, DR JOSEPH A. BLAKE, in the Chair

LIGATION OF EXTERNAL CAROTID AS A PRELIMINARY TO EXCISION OF CARCINOMA OF TONGUE

DR FRANK S. MATHEWS presented a man, fifty-five years old, who was operated on about a year ago for a carcinoma of the tongue. At the time of the operation there was an extensive growth involving the right side of the tongue and extending down towards the floor of the mouth. The complete removal of the involved tissue and submaxillary glands on both sides necessitated quite an extensive dissection, the operation occupying an hour and a half. The preliminary ligation of the external carotid rendered the operation within the mouth bloodless, and greatly facilitated the work within the mouth.

Dr Mathews said he had resorted to preliminary ligation of the external carotid in three cases similar to this one, in two of these the operation within the mouth was practically bloodless. In the third case, that of an old man, there was considerable hemorrhage which was checked with difficulty by packing. He showed the case to emphasize the ease and speed with which

extensive excisions can be performed in the mouth after ligation of the carotid. In the case presented he thought not more than five to ten minutes were used in excising the tongue and putting some sutures in the floor of the mouth.

PERFORATED ULCER OF THE STOMACH

DR. WALTON MARTIN presented a man thirty two years old who was admitted to the Roosevelt Hospital in the service of Dr Blake on December 6 1908. The history he gave was that at 9.30 that morning twelve hours before admission he was seized with agonizing abdominal pain. He had risen but had had no breakfast. The pain was situated near the navel and was of an intense burning character. Later in the day it extended to the lower abdomen especially to the right lower quadrant. He had vomited a small amount of whitish material shortly after the onset of the pain. The bowels had not moved for twenty four hours. About half an hour after the onset of his pain he noticed that the entire abdomen became hard.

Previous history. For the past year the patient had suffered from digestive disturbances with pain of a burning character coming on about half an hour after eating. For the past month the pain had been much more severe and at times had incapacitated him for work. He had often vomited a sour material but never blood. He had lost 20 pounds in weight during the past year. Otherwise his past history presented no points of interest.

On examination the abdomen was found to be slightly distended. Respiration was mainly thoracic. The abdomen was rigid and extremely tender the tenderness being most marked over the right lower quadrant. The percussion note was tympanic. Liver dulness was absent. The man was poorly nourished his expression was anxious the legs were drawn up. His temperature was 100 pulse 108 respirations 36. The blood count showed 21,000 leucocytes polymorphonuclear cells 96 per cent.

At 9 o'clock a little over thirteen hours after the onset of his pain under ether anaesthesia a median incision extending from the ensiform to the navel was carried through the abdomen. A large quantity of fluid evidently gastric content immediately welled up in the wound. The stomach was drawn into view and a perforation about one centimetre in diameter was seen near the

pylorus This was closed with Halsted mattress sutures of linen, and as this closure obviously considerably narrowed the pyloric orifice, a posterior gastro-enterostomy was rapidly carried out, a Murphy button being used for the anastomosis The abdominal cavity was then thoroughly irrigated with normal salt solution, and the abdomen closed without drainage

The patient made an uninterrupted recovery The button was passed on the seventh day The temperature reached normal on the fifth day, and he left the hospital on the twenty-third day He had gained about twenty pounds in weight since the operation

LARYNGECTOMY

DR F KAMMERER presented a man about fifty upon whom he had done a total laryngectomy for epithelioma of the larynx The patient came to him in October, 1908, suffering from dyspnoea, which necessitated a preliminary tracheotomy The growth of the intralaryngeal mass had been watched by a specialist for several months, but no definite diagnosis had been made A piece of tissue removed by way of the larynx had failed to clear up the situation

Four weeks after the tracheotomy, a laryngectomy was done The patient was placed in an inclined position, his head being at the lower end of the table The most troublesome part of the operation was the transverse section of the trachea somewhat above the tracheotomy wound, and the suturing of the tracheal stump to the skin in the lower angle of the wound After the larynx was excised, it was possible to close the entire pharynx by buried sutures, no leakage occurring, although the patient began to take liquids the day after the operation

The tumor was much larger than a walnut, springing, apparently, from the left vocal cord No enlarged lymphatics were found at the time of operation, five months ago Since then the patient has gained twenty-five pounds in weight, and showed no signs of recurrence at present

Dr Kammerer thought that the mortality after excision of the larynx, for some reason or other, was smaller when a preliminary tracheotomy had been done some time prior to the laryngectomy This operation, he believed, should, if possible, consist of a transverse section of the trachea followed by suturing of the lower tracheal stump to the skin,

DR GEORGE E BREWER said that from his experience with laryngectomy he was inclined to favor a preliminary tracheotomy although he was aware that Gluck who had the best statistics never resorted to it and only entered the trachea when he divided it

Dr Brewer said he had operated on three cases by the Gluck method and all of them died of infection of the cellular planes of the neck a danger which he thought might have been avoided by a preliminary tracheotomy Since then he had operated on four additional cases first doing a preliminary tracheotomy and postponing the laryngectomy until adhesions had formed These apparently acted as a barrier to infection and all four of these cases recovered His personal experience therefore would lead him to favor a preliminary tracheotomy doing the laryngectomy at a later stage

OPERATION FOR BRONCHILCTASIS

DR F KAMMERER presented a woman of thirty who has been ill since the summer of 1906 On several occasions during the last three years she has been seized with chills and high fever cough and expectoration lasting for weeks In September 1907 a lung abscess was diagnosed the eighth rib on the left side was partly excised and an incision into the lung tissue was made which resulted in the evacuation of purulent material but no cavity of the lung was discovered A profuse seropurulent discharge for two months followed packing of this incision then the wound closed the patient continuing to expectorate the same material that had been discharged from the wound During 1908 she was operated on three times for the relief of pent up secretions beneath the old cicatrix and drainage tubes were introduced but a fistula continued to persist

In December 1908 when the patient came under Dr Kammerer's care she had fever of a septic type She was much emaciated There was a discharging sinus on the left side of the thorax and she was expectorating considerable quantities of foul material Under very light narcosis assisted by morphine four ribs were resected from the costal angle to the anterior axillary line The pleural cavity was obliterated at this point After incising through contracted and cicatricial lung tissue to the depth of about half an inch with the Paquelin cautery a cavity

fully the size of an egg was opened, which was traversed by trabeculae of altered lung tissue, and into which several bronchi opened. There was hardly any hemorrhage from this procedure, but division of the various septa in the cavity necessitated ligation of some of the divided strands. After the lung cavity had been thoroughly exposed, it was packed with gauze.

The patient's condition caused some anxiety during the first week, as the sepsis only gradually subsided. Now, about three months after the operation, she is in excellent condition. The fever had entirely disappeared, and the thorax had greatly contracted following the generous resection of the ribs. There is an opening as large as a silver half dollar in the skin, which communicates with a shallow cavity in the lung tissue. When the patient coughs, the lung tissue is forced into this opening, and muco-pus, in moderate quantities, escapes from several bronchi. The speaker thought that these could be closed by some plastic operation, and would not, in the case under consideration, demand resection of lung tissue to any greater extent.

DR JOSEPH A. BLAKE said he thought the wound of the lung had healed and was covered with epithelium. He expressed the belief that a partial resection of the lung would be necessary to close the wound.

LUNG DECORTICATION AND THORACOPLASTY FOR PERSISTENT THORACIC SINUS

DR CHARLES N. DOWD presented six patients illustrating the results of this procedure.

CASE I—A O'N, aged twelve. First seen in April, 1907, having an empyema of long standing (symptoms for two months). A piece of the ninth rib was resected in the posterior axillary line without delay, and a large amount of pus evacuated. On inserting the finger through the chest wall the lung could not be felt.

After six weeks the amount of discharge was excessive. The boy was showing extreme contracture of the chest, so that he had marked lateral curvature. The intercostal spaces were obliterated and the chest wall was rigid. An incision was therefore made in the chest wall and carried up to the anterior axillary line, so that pieces of the eighth ribs were excised, about half an inch of the third, three or four inches of the tenth, and corresponding

pieces of the intervening ones. The costal pleura was half an inch thick. The ribs were much flattened in their vertical diameter and a sinus was found running to the apex of the lung. The lung was so much compressed that it could not be at first distinguished but after an incision through the pulmonary pleura it was found and on letting the patient come from ether enough to cough it dilated considerably. The pulmonary pleura was then removed over an area of one by three inches and it was separated a little more about its edges. The lung bulged still more so as almost to fill the cavity. Loose packing was inserted. There was no undue reaction although there was considerable oozing of bloody serum. The chest healed within a few weeks and he was apparently in good condition.

He was again seen September 19, 1908, a year and five months after his first operation. The sinus in the chest had opened and led to the apex of the lung. It was again exposed by opening the chest in the line of the old incision. The lung was very much contracted but expanded again after removal of a piece of the pulmonary pleura. A small portion of the chest wall was removed along the edges of the incision. Healing followed in a few weeks and he is now in excellent condition. There is no lateral deviation of the spine. The left lung and left side of the chest are normal. On the right side there is a respiratory murmur of good quality at the apex but at the base it is harsh. The chest wall on this side shows only a quarter of an inch expansion and is three and a half inches less in diameter than the left.

The short lapse of time between the first and second operation in this case is worthy of note. It was only six weeks while the average in the writer's cases has been fifteen months. The extreme chest contracture and lung compression indicated the futility of further delay and subsequent history verified this indication.

CASE II.—Lung decortication and thoracoplasty three years after primary operation for empyema. The boy who is now seventeen years old had his first operation for empyema in 1897. A few months later a second operation was done in one of the city hospitals and tuberculosis was found in the pleura. Wound healed but opened again and in October 1899 the writer excised a portion of five ribs the fourth to eighth and corresponding portions of the chest wall.

In November 1900 a sinus still persisting the sinus was ex-

posed and the pulmonary pleura incised and stripped back. This lung expanded well when liberated from the pleura, although it had been confined for more than three years. Final healing took place about a year and a half later and he has remained in good condition ever since. Circumference of that side of the chest is two inches less than the other, and he has about half an inch expansion with his respiration. He is in good health, has no signs of tuberculosis and no spinal curvature.

CASE III—Now fourteen years old. His first operation was February, 1900, for a neglected empyema, with a perforation in the anterior chest wall. A portion of the seventh rib was resected in the posterior axillary line, and for about four months efforts were made to drain the pleural cavity through this opening and to expand the lung by using forced expiration, aided by Wolf bottles. That side of the chest also became more and more contracted and he was getting lateral curvature, and since the sinus extended to the apex a second operation was done.

Small portions of the ribs from the third to the ninth inclusive were removed. The pulmonary pleura was stripped back. The lung expanded and healing took place within a few weeks. He now has good respiratory murmur to the base of the lung on that side. One inch expansion. The circumference is two and a quarter inches less than that on the other side. No lateral curvature. He is in excellent health and is one of the best tennis players in the Van Cortlandt grounds.

CASE IV—A. E., present age nine years. First operation for empyema March, 1904. Pieces of two ribs resected in posterior axillary line. Extreme collapse of lung. After treatment for about four months there was still a sinus leading to the apex, which on operation was found to be large enough to hold two fingers. A piece of pulmonary pleura was dissected, about one and a quarter by three inches, and pieces of ribs (fourth to tenth) were resected. Healing took place in two months. At the present time (four and a half years after operation) she is in excellent health, with good respiratory murmur on both sides of chest, the right side being about two inches less in circumference than the left, and having half an inch expansion.

CASE V—Aged six. Operation similar to the other, on September 11, 1908, for a thoracic sinus following an old empyema. She had extreme contraction of the right side of chest. Healing

has just taken place and her general condition is excellent. About like that of Case IV

CASE VI—Instead of resecting portions of the ribs a cut was made along the anterior axillary line the wound was retracted the pulmonary pleura was incised and the chest wall and ribs brought together again careful union being made by chromic gut with the exception of one rib where silver wire was used. The suction apparatus was then applied and rapid healing is progressing. The likelihood of a good chest is better than in the other cases where resection of more ribs had to be made but the procedure is manifestly only applicable to those cases which show good lung expansion

ABSCESS OF LIVER

DR LUCIUS W HOTCHKISS presented a man thirty five years of age who had suffered from a large central abscess of the right lobe of the liver for which drainage through the anterior chest wall had been secured by resection of the seventh costal cartilage

This case was shown to illustrate the difficulties both of diagnosis and effectual treatment in these cases. The patient had been admitted to Bellevue Hospital a few weeks previously at first to the medical wards and subsequently transferred to the surgical side

His previous history excepting for an attack of dysentery the previous summer was not material and as the history of his dysentery was brought out after the operation it was of no assistance in making the diagnosis. About two months prior to his admission and after eating a hearty meal he was suddenly seized with severe pain in the pit of the stomach. This pain lasted for two days without relief. After this it was less severe but he continued to suffer from it ever since more or less although his suffering was modified considerably by the character of his food. The pain which came on when he woke up in the morning was of a griping character it was confined to the epigastrium did not radiate and was often relieved by a cup of hot fluid such as tea. The pain always returned though not so severely after his other meals and was always of the same character though often relieved by pressure and hot drinks. While in bed the pain was worse when lying upon the side also after taking solid food and after exercise. There was never any nausea or vomiting

The bowels had remained regular until two weeks before admission, when he had a slight diarrhoea with watery stools but no blood. Up to the onset of his attack his appetite had been good, but since then, in consequence of the distress caused by solid food, he had lived largely on a fluid diet. He had lost twenty-five pounds in weight, and began to feel weak and ill. He remained at work, however, until a week before coming into the hospital, when he had to give up by reason of his pain and weakness.

Physical examination was negative, save for the discovery of an area of tenderness and muscular spasm over the upper segment of the right rectus muscle. The lower border of the liver was not made out, and the urinary examination was negative. He ran a somewhat irregular temperature, but examinations of the blood for malarial organisms, as well as the Calmette test, failed to give any aid in the diagnosis. The white blood count, however, showed an increased leucocytosis, and the polymorphonuclear percentage was relatively high. In view of these findings, and the inability to make a diagnosis without exploration, he was transferred to the surgeons.

At this time the white blood count ranged between 12,000 and 13,000, and the polymorphonuclears between 80 per cent and 82 per cent. His temperature was markedly intermittent, ranging from normal in the morning to 104 F, and on the day prior to operation it rose sharply to 105. The man looked and felt very sick and weak, and complained of a constant pain in the region of the epigastrium, where he was also very tender on pressure. No mass could be felt. He was thereupon prepared for operation, with a tentative diagnosis of encapsulated peritoneal abscess from perforation of a gastric or duodenal ulcer.

Operation, January 18, 1909, under ether anaesthesia. The abdomen was opened by an incision through the right rectus muscle above the umbilicus, and the region of the gall bladder, stomach and duodenum was explored. There was nothing abnormal in any of these organs, although the peritoneum was somewhat congested in appearance and there were some light adhesions between the pylorus, duodenum and the gall bladder. There was no trace of an ulcer, as manifested by external appearance, in either organ. Feeling then that the trouble must be in the liver, the fingers within the abdomen were passed up over the dome of the right lobe, and, just in front of the coronary liga-

ment they encountered recent adhesions to the diaphragm and a small area of softer consistency in the substance of the organ. Retaining the finger in touch with this spot an aspirating needle was thrust through the anterior chest wall from the front passing through the sixth intercostal space on the right side and into the substance of the right lobe of the liver. The needle entered an abscess cavity and pus was withdrawn. Keeping the needle in place as a guide the abscess was exposed by excising the cartilage of the seventh rib which was just below the needle and after cutting through the diaphragm which was stitched to the edges of the wound and protecting the pleural cavity (which had been opened) by a gauze pack the liver was opened and a large quantity of characteristic pus was evacuated. The cavity of the abscess was explored with the finger but it was so large that its full size could not be made out. After washing it out with saline solution a large tube was inserted and the abdominal incision was closed after making a puncture for a drainage tube in the right flank.

The discharge from the wound was at first moderate but later it became very profuse. The lateral drain into Morrison pouch was removed on the third day and was not reinserted as there was apparently no need for it. The discharge through the liver drain continued for several days gradually diminishing as the cavity of the abscess filled up. The tube was finally removed on February 3 although the sinus continued to discharge a little until about February 27. The patient's condition was at once greatly benefited by the operation. He gradually improved in health and strength and when he left the hospital on March 10 he had regained most of his lost flesh. His wounds were completely healed and he was able to resume his work.

Dr Hotchkiss said this case illustrated the difficulty of approaching a central liver abscess in such a manner as to provide for effectual drainage. He wished to put on record the anterior route as adopted in this case by resection of the costal cartilage as a means of safely reaching and draining a central hepatic abscess which tends to point towards the diaphragm and which cannot be well approached or so effectively drained by any of the usual methods of operation.

LIGATION OF THE EXTERNAL CAROTIDS, WITH REPORTS
OF SEVEN LIGATIONS IN FOUR CASES

DR ARTHUR L. FISK read a paper with the above title, for which see page 767

DR ROBERT H. M. DAWBARN, referring to the difficulty of recognizing the external carotid, and the elaborate dissection that was often necessary in order to distinguish it positively from the internal, said his experience had taught him that a change in the pupil was a reliable guide to go by. Ligation of the internal carotid caused the pupil to contract, while ligation of the external produced no effect on it.

Dr Dawbarn said that ligation of the external carotid had practically no mortality, whereas, as Dr John A. Wyeth had shown, ligation of the internal had a mortality of about 44 per cent. Personally, the speaker said he had tried the external carotid over one hundred times in the live subject, but that hereafter he expected to resort to that procedure very rarely, as he had found that sequestration anæmia, with the patient in the upright position, answered every purpose in operations about the head and face.

TRANSACTIONS

OF THE

PHILADELPHIA ACADEMY OF SURGERY

Stated Meeting March 1 1909

DR WILLIAM J TAYLOR President in the Chair

OSTEOTOMY OF FEMUR FOR HIP ANKYLOSIS

DR RICHARD H HARTE presented two patients upon whom osteotomy had been done for relief of ankylosis of hip in bad position

CASE I—Female now twenty five years of age had tuberculous disease of the right hip when five years old She first came under Dr Harte's care at the Orthopædic Hospital in November 1904 at the age of 20 years Her right hip was then ankylosed in slight adduction and marked flexion There were scars of four old sinuses on the outer side of the thigh and in the inguinal region She wore a shoe with a heel six inches high walking with the foot in a position of extreme equinus and having a marked limp She came to the Orthopædic Hospital not for the deformity but on account of pain in the hip After being in bed at the hospital for one month with extension she was discharged wearing a high shoe (six inches) which held her foot in normal position In July 1905 a sinus behind the great trochanter opened and for this she was again put to bed in September 1905

On November 23 1905 Dr Harte did an osteotomy below the lesser trochanter with osteotomes The thigh was brought down into a position of almost complete extension and slight adduction to overcome the previous shortening She remained in bed with extension and sand bags for nine or ten weeks and then gradually resumed walking Measurements made in March 1906 four months after the operation are recorded as follows

Right side from anterior superior spine of ilium to internal malleolus 28 5 inches

Left side from anterior superior spine of ilium to internal malleolus 30 5 inches

From umbilicus to internal malleolus right 32 5 inches

From umbilicus to internal malleolus, left, 33 5 inches

In May, 1906, the sinus back of the trochanter closed, and has remained closed since. In September, 1906, the patient was again in bed with some pain in the hip, but since then there has been no pain whatever. She now walks with a barely perceptible roll, wearing an ordinary shoe, with not even a lift on the heel. She has walked thirty city squares at a time, without experiencing discomfort.

CASE II—A lad, aged seventeen years, came to the Orthopædic Hospital in February, 1908. In July, 1907, he had had typhoid fever, being treated in St Mary's Hospital, the typhoid being followed by an arthritis of the left hip joint. He remained in bed in the hospital until November, 1907, and was in bed for a month at home after his discharge. When he first came to the Orthopædic Hospital, in February, 1908, he walked with a marked limp, with the aid of a cane. The left hip was ankylosed in a position of twenty degrees of flexion and twenty degrees of abduction, with marked external rotation, so that as the lad lay on the bed the outer surface of his sole rested flat on the mattress. In April, 1908, osteotomy below the lesser trochanter was done, with osteotome. He was kept in bed with extension and sand bags for eight or nine weeks, and when discharged was walking with scarcely appreciable limp, the deformity having been corrected. It has been impossible to trace this patient since his discharge.

CASE III—A girl, aged fourteen years, suffered from typhoid fever in May, 1908, being treated at her home. A small abscess which formed above the right trochanter was lanced by her family physician. In June a large abscess developed in the left iliac fossa, and for this she was sent to the German Hospital, where the abscess, deep in the pelvis, was opened by Dr Deaver, by an incision parallel to Poupart's ligament. She was discharged from the German Hospital in August, and was at home for two weeks, when she was first brought under Dr Harte's care at the Orthopædic Hospital, September 3, 1908. There was fibrous ankylosis of the left hip in flexion and adduction, and she was put to bed with weight extension for over two months to see if any improvement could be obtained without operation. Examination November 11, 1908, showed that there was a range of motion in the left hip, of flexion and extension, of about ten degrees, extension being impossible beyond 133 degrees and flexion im-

possible beyond 123 degrees. Very slight rotation was possible in flexion. There was adduction deformity of 10 degrees and no abduction was possible. A photograph made at this time shows the flexion deformity well as well as the scars of the incisions for the iliac abscess.

Osteotomy below the lesser trochanter was done with osteotome in December 1908 and the patient was kept in bed with weight extension and sand bags for eight or nine weeks. She now walks well without any support only a slight limp being noticeable and the thigh being in excellent position—very slight flexion abduction of 15 degrees. There is no motion in the hip except very slight rotation. The shortening of the whole lower extremity is three fourths of an inch.

DR OSCAR H. ALLIS said that the point which Dr Harte made in regard to supporting the upper fragment is an extremely important one for if the old trouble is disturbed even if it has been ankylosed for twenty years it may set up trouble and carry the patient perhaps to the grave. As an illustration of this he cited the history of a woman who when a little child went through all the stages of hip disease abscess etc and got well. She walked with the traditional limp until about twenty two or twenty three years of age attending to her work and earning a good living. She then married. As it was impossible for her to be delivered through the natural passages she was subjected to Cæsarian section. The operation was skilfully performed the mother and child both recovering. Both are living to day but within one week of the time she was operated upon the old trouble with the hip began extensive abscesses formed and it has now gone through every stage of hip disease. Though Dr Allis had resected the joint it is still suppurating the whole hip joint region has been involved. He believed the cause of this disaster was that the thigh was badly adducted and flexed and since a child is to be delivered by Cæsarian section it is to be done in as short a time as possible it is probable that an assistant in this case took the thigh forcibly dragged it out of the operator's way breaking up old attachments and doing just exactly what Dr Harte has so properly warned against.

DR A. P. C. ASHHURST said that there is in existence an interesting correspondence between Mr Adams and his father (Dr John Ashhurst) on the subject of this operation and Mr Adams laid particular stress on the points raised by Dr Harte and Dr

Allis, that it is not advisable to make a large wound or to disturb the joint too much Mr Adams said, in effect, that it was enough to make his hair stand on end to read and hear of the various operations done under his name, in which large wounds were made, etc His operation was a mere puncture made over the outer surface of the femur, along the tract made by this puncture he passed his little saw, and he sawed very gently, and did everything with neatness and precision

GUNSHOT WOUND OF THE BRAIN WITH REMARKABLE RECOVERY OF FUNCTION

DR WILLIAM J TAYLOR presented a girl of two years of age, who was first seen by him at St Agnes Hospital on April 1, 1907 On Sunday, March 10, 1907, twenty days before, while she was lying in bed, her little brother fired a thirty-two calibre revolver within a short distance of her head The ball entered one-half inch to the left of the middle line, directly over the glabella, and must have passed through the frontal sinus and directly backwards and upwards and emerged from the skull on the right side over the parietal protuberance at a point two and one-half inches from the middle line and two inches back of the mid-auricular line The ball was found on the pillow by the side of her head There was tremendous hemorrhage, and unconsciousness for two hours There was total palsy of the left side, and on Tuesday, the wound having been made on Sunday, she had a series of general convulsions which continued at intervals until Friday She regained power in the left leg, but on the first of April, twenty-one days after the injury, there was still total palsy of the left hand and arm She was so young that it was very difficult to tell whether there was any alteration in sensation or in eyesight or taste, but apparently these were normal

On April 2, as both the wounds of entrance and exit were suppurating, and at the wound of exit there was quite a distinct swelling, she was given ether and the wound of exit explored There was a hole in the skull about three-quarters of an inch in diameter, through which was protruding quite a distinct fungoid mass At the side of this was a piece of bone detached from and standing at right angles to the skull After removing this piece of detached bone and cutting away a few jagged fragments of bones, nothing further was done Up to this time she had been extremely restless and unable to sleep, but almost immediately

quieted down and had good and restful nights. Very quickly she regained the power and control over the left arm. She was very anæmic having only forty per cent of hæmoglobin. By April 16 her color had improved her appetite was good and she was taking a large quantity of various foods. She slept soundly all night and took a long nap in the day and she had regained complete power over her left upper extremity. This she now used quite freely could move the hand and arm in any direction and lift it high up over her head and it was impossible to detect any want of control or movement in it. She was able to walk around by herself with perfect equilibrium and the wounds both of exit and of entrance had healed except for a small scab. At no time had she any rise in temperature her convalescence being absolutely uninterrupted. On May 7 the wound of exit discharged some pus but this soon healed and from that day to this she has remained perfectly well. There is no palsy no evidence of any alteration in her intelligence or power of motion there have been no convulsions or other evidence of brain irritation.

He reported this case as a remarkable example of the tolerance of the brain to mechanical interference. This bullet must have passed through the frontal sinus through the temporal lobe and through the substance of the parietal lobe to its exit just posterior to the parietal eminence. The soft bones of the skull of a child of this age could not have presented sufficient resistance to have deflected the bullet in any way.

TRAUMATIC ASPHYXIA

DR DUNCAN L. DESPARD read a paper with the above title including a report of a case for which see page 751.

CYANOSIS FOLLOWING AN EPILEPTIC SEIZURE SIMULATING TRAUMATIC ASPHYXIA

DR F. J. ALEXANDER read a paper with the above title for which see page 762.

DR JOHN H. GIBBON said that he saw the case described by Dr Despard. It was the first he had ever seen. The moment he saw it he was struck by the resemblance it bore to that colored plate published in the ANNALS OF SURGERY with the paper on the subject by Cobb and Beech. Although much like the photograph referred to the discoloration was not as sharply defined. In this

case the discoloration went down on the side of the neck. The palsy is another interesting feature. Dr Alexander's case, he thought, was more unique, because apparently it pathologically simulates traumatic asphyxia very closely and differs from the ordinary extravasation and discoloration seen in cases of epilepsy. The long duration of the discoloration differed from the ordinary discoloration of a bruise, as did also the way in which it faded. In Dr Despard's case, as the discoloration paled, there was not the slightest yellow or greenish discoloration, as takes place in extravasated blood. This clinical observation would tend to corroborate the findings on skin section made in the Cobb and Beech case, and in one or two others referred to by Dr Despard, namely, that there is a stasis of the blood in the capillaries with very little extravasation into the perivascular tissue.

DR DUNCAN L. DESPARD said that it seemed to him that Dr Alexander's case belongs in the same class with traumatic asphyxia. The discoloration in both cases must have been due to the same causes. In this connection, it is interesting to recall the case of Perth, in which the injury was in a boy who was lying in a soft, sandy road, and the wheels of a cart passed over the abdomen alone, not injuring the thorax, so that the increased pressure in the thorax and vessels of the neck was caused by the pushing up of the diaphragm and thereby increasing the intrathoracic pressure. In an epileptic the same condition may be produced, not only muscles of the thoracic wall but the diaphragm itself taking part in the rigidity, thereby preventing respiration. The limitation of the discoloration is a question of interest. Some of those who have reported cases, Tardieu for instance, say that the surfaces are free from the discoloration where pressure was made from the outside by clothing. Apparently the vessels were sustained and supported by this extravascular pressure. The same thing occurred where the inspector's cap was driven down over the forehead, in the case reported by Bolt.

DR E. J. ALEXANDER (by invitation) said that he had had the opportunity of seeing another case of traumatic asphyxia occurring about the same time as Dr Despard's. The patient was admitted to the Episcopal Hospital in the service of Dr Frazier. The man was in a railroad accident, having his chest caught between two cars. He had some discoloration, as in Dr Despard's case, with bloodshot eyes, but unfortunately he died within two hours of admission, and there was no autopsy.

BOOK REVIEWS

NIERENDIAGNOSTIK UND NIERENCHIRURGIE By Dr G KAR
SAMMER Part I With 29 illustrations in text Vienna and
Leipzig Wilhelm Braumüller 1907

The author of this work on the diagnosis and surgery of the kidney has long been the assistant of Professor von Frisch of Vienna. The amount of material that comes to this clinic for examination, diagnosis and treatment is unusually large and the opportunities for work are very favorable for students. In the preface to the first volume the author states that he has succeeded in establishing some facts in relation to the meaning of certain phenomena observed in relation to the functioning power of the kidneys. The question of diagnosis in diseases of the kidney is considered in the light of the newer methods of diagnosis where until now the exact diagnosis was the exception it has become the rule it makes early diagnosis and early operation possible. Nephrectomy in the presence of a second diseased kidney is made almost impossible.

In the first part of the book the author takes up the older methods of kidney diagnosis the physical and chemical examination of the urine the functioning ability of both kidneys in relation to each other cystoscopy and the subject of ureter catheterism with the iodine test the methylene blue test the floridzin test and experimental polyuria are carefully considered in their relation to kidney diagnosis.

In the second part of the book the practical application of modern kidney diagnosis is considered and also the various surgical diseases of the kidney showing the relationship of the newer methods of examination to the diagnosis and therapy thereof.

At the end of the first volume is a bibliography containing over 1800 references occupying 100 pages. When one looks over the list of this endless number of monographs that have been written on the subject of the functional diagnosis of the kidney

it is easy to understand why so many look askance at the reports which are given to us. However, all these various sources of information have been carefully considered and the author divides the important features into three classes: the cryoscopic, the chromo-cystoscopic, and the floridzin test. Kuemmell and his school are most emphatic in their belief that cryoscopy is a very valuable method of determining the functioning ability of the kidney, while the author believes that it is no more important than the specific gravity of the urine, and bases his estimation more on the floridzin test, believing that histological examinations have proved a distinct relation to exist between the time of the appearance of sugar in the urine and the severity of the anatomical damage to the organ, the more severe the pathological lesion, the longer it takes for the sugar to appear.

Next to the floridzin test he places the methylene-blue and indigo-carmin tests, but qualifies somewhat their worth.

The second part of the book is rich in material taken from the clinic of von Frisch, 182 surgical cases, including tuberculosis, neoplasms, calculi and pyonephrosis, are analyzed, especially from the diagnostic point of view.

The book is practical, and to the student of renal surgery and diagnosis it adds a most valuable chapter to his knowledge of the subject.

TO CONTRIBUTORS AND SUBSCRIBERS

All contributions for Publication, Books for Review, and Exchanges should be sent to the Editorial Office, 386 Grand Ave., Brooklyn, N. Y.

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EDITED BY
LEWIS STEPHEN PILCHER M.D. LL.D.
OF NEW YORK

WITH THE COLLABORATION OF

J. WILLIAM WHITE M.D. LL.D.
OF PHILADELPHIA
Professor of Surgery in the University
of Pennsylvania

SIR WILLIAM MACEWEN M.D. LL.D.
OF GLASGOW
Professor of Surgery in the University
of Glasgow

SIR W. WATSON CHEYNE C.B. F.R.S.
OF LONDON
Professor of Surgery in King's College

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CONTRIBUTORS TO VOLUME XLIX

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Where Bovinine is administered a result of this kind does not happen, for the reason that it contains every element of nutrition, together with normal organic iron, which is more readily assimilated than inorganic iron, does not constipate or over-stimulate the young cells, consequently, there can be no form of malnutrition or anæmia that is not fully and completely met, whether it be local or general. Bovinine is a thoroughly sterile preparation, gently stimulant, and requiring little or no digestion, a point of great importance in the treatment of all chronic conditions, wasting diseases, and fevers.

SCIATICA

"One of the most common causes of sciatica is rheumatism, so often, indeed, is this the causative influence that some writers include it among the varieties of rheumatism," says Dr. U. C. Underwood, of Louisville, Ky. "The treatment of the affection," he states, "includes remedies to counteract the constitutional factor at work in the production of the disease and measures looking to the relief of the pain. As anodynes, opium is to be studiously avoided in all cases. Antikamnia is a reliable anodyne, which does not produce cardiac depression and will give relief without injurious after effects. In sciatica it is best given in tablet form, with salol

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SUMMER-TIME IS SPRAIN-TIME

Some wit has said that "summer-time is sprain-time." Golf, tennis, baseball, and the other outdoor sports inaugurate a season of sprains and wrenches, and ankles, knees, wrists, elbows, shoulders, and backs, pay the penalty of a missed drive, an overhand smash, or a slide to base. The resultant conditions, the stretching or tearing of ligaments, contusion of the synovial membrane, and damage to vessels and nerves, are best remedied by the use of Antiphlogistine, which markedly aids in the reconstruction of the injured part.

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Since dysmenorrhea, like all other anomalies of menstruation, is merely a symptom of a pathologic state of the uterus or one or more of its appendages, it is perfectly obvious that remedial agents capable of effecting the removal of the underlying cause are preferable, in its treatment, to drugs that are solely palliative in action.

In the treatment of all varieties of dysmenorrhea it is possible to relieve the pain at once, normalize the pelvic circulation, restore the uterine contractile power, and correctively affect the acting cause. By such a course the comfort of the subject is more

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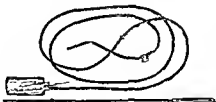
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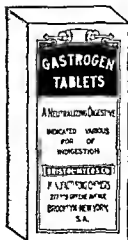
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